Smithsonian

October 1989

Balsa masks of the Opata Indians in Mexico are among the treasures of the Heye Collection (p. 42)

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Lumina Euro Sedan

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What Your Family Can Look Forward To.

October 1989

Smithsonian

Volume 20, Number 7

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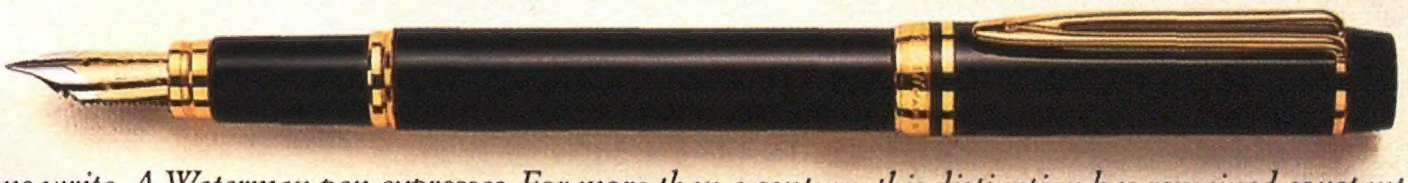

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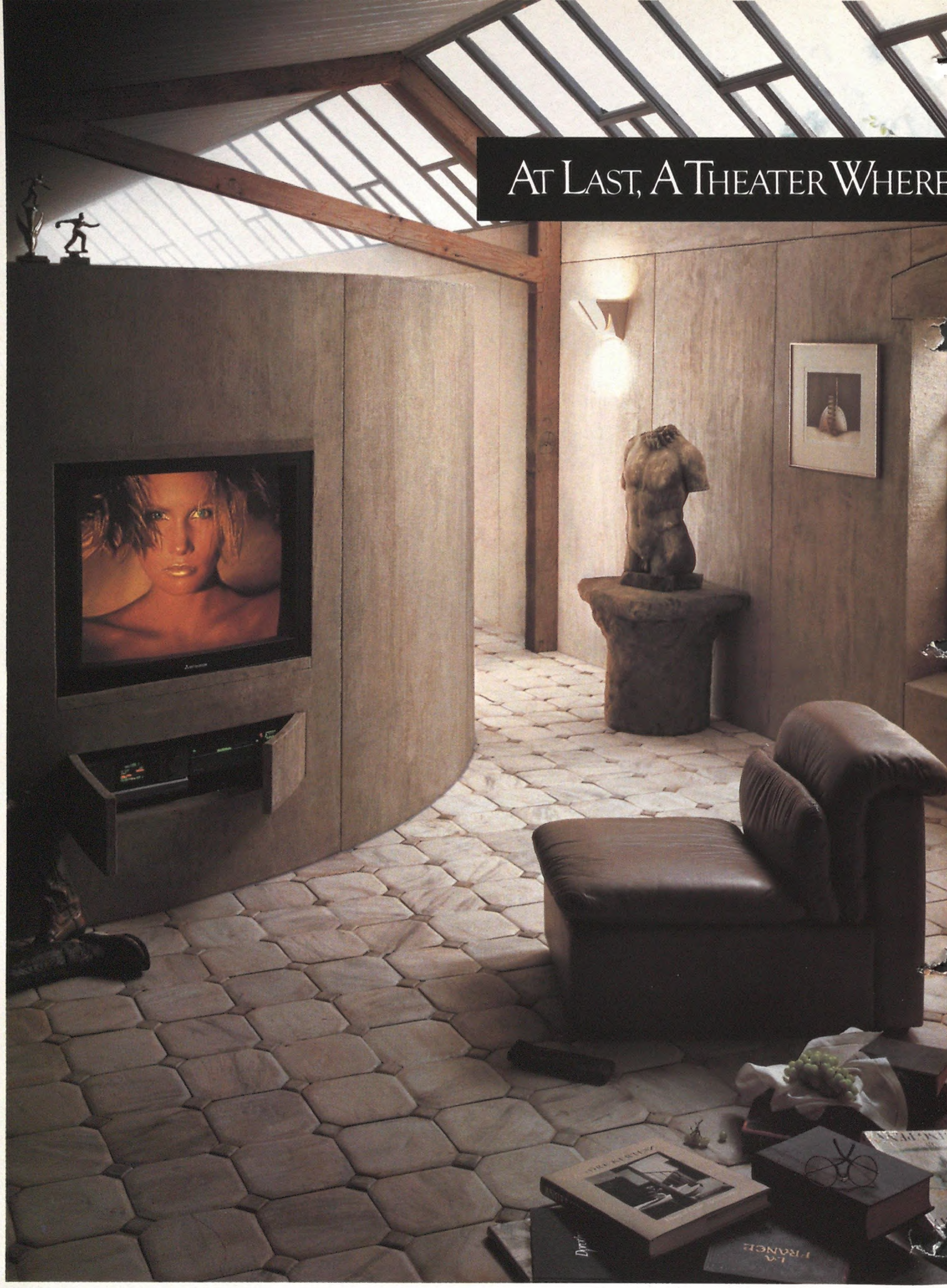
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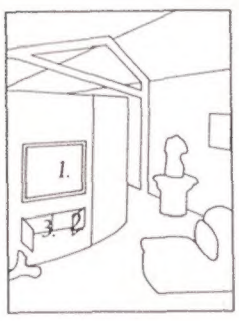

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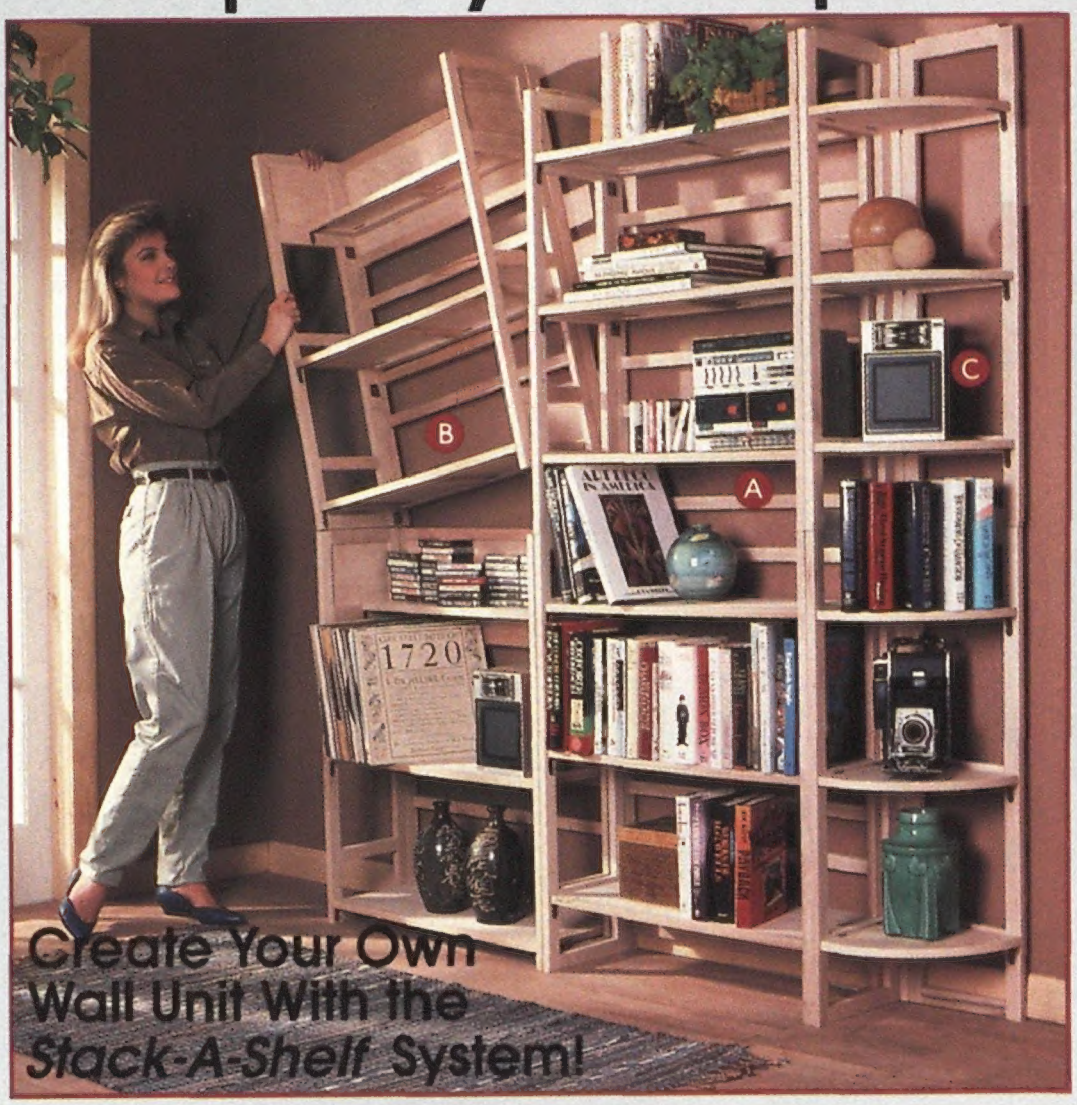

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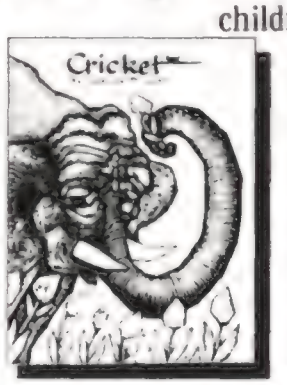

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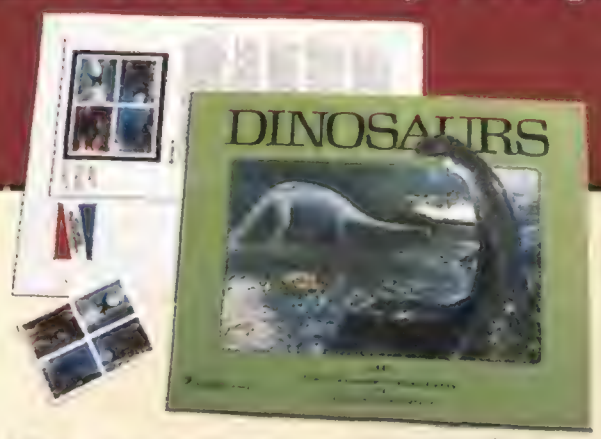

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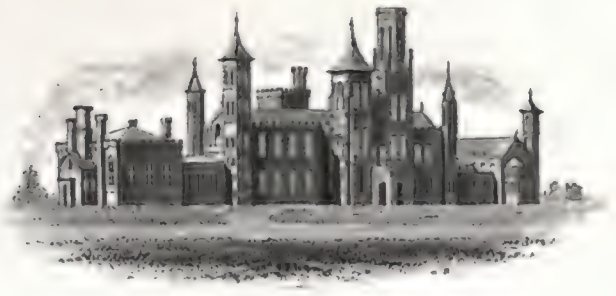
Secretary Adams' comments



Smithsonian horizons

A dispute over a photography exhibit raises once again the relationship of art to conventional standards of taste

A bitter and still-spreading controversy in the arts was recently precipitated when the Corcoran Gallery of Art in Washington, D.C. canceled its plans to exhibit the photographic works of the late Robert Mapplethorpe. The cancellation of the show—characterized by some as including depictions of sado-masochism, homoeroticism, disturbing images of children and portrayals of sex acts beyond the limits of public tolerance—led to two opposing forms of protest. One was an immediate invitation from the Washington Project for the Arts, less susceptible than the Corcoran to public and official pressure, to transfer the exhibit to its smaller galleries. The other was the passage by the U.S. Senate of a measure introduced by Senator Jesse Helms, which would prohibit federal funding not only of work of this character but of material denigrating "a person, group or class of citizens on the basis of race, creed, sex, handicap, age or national origin."

The Smithsonian, along with the National Gallery of Art and virtually all other art institutions, will fall within the scope of this sweeping measure if it receives full Congressional approval. Hence it is inappropriate for me to comment on it directly. But there are other considerations that ultimately may transcend in importance the fierce and widely divergent reactions that have arisen so far. Some reflections on them may be appropriate, particularly since they touch on the Smithsonian's own stance in relation to contemporary American society.

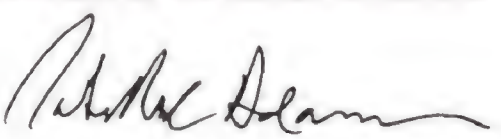
To begin with, we must recognize that an overwhelming trend of our times is not toward homogeneity but toward increasing diversity of individuals and groups, expressed in culture, values, and preferences or priorities of every kind. Among reasons for the decay of the image of the "melting pot" as a national goal are heightened immigration, and the growing preponderance of those we can no longer call "minorities" in a number of cities and regions—and their determined efforts to overcome persistent legal and social inequalities while still retaining an ethnic or linguistic heritage. But new, single-interest constituencies, sometimes vociferously intolerant of those opposing them, also are proliferating and gaining power. The simple fact is that there are fewer and fewer issues on which anyone can pronounce a national consensus.

It must also be kept in mind that the relationship of art to conventional taste has been historically dynamic and tension-ridden. Some of Edouard Manet's best-known paintings are among the many works that are now regarded as masterpieces but that initially evoked storms of abuse. Legal proceedings have frequently turned on the difficulties of defining what is obscene. If the public or private support of art is conditioned by arguments that it must somehow support the "general welfare," judgments as to whether and how it does this will almost inevitably tend to be time- and situation-dependent.

Americans can take credit for having traditionally accorded a high and broad, perhaps unique, level of private support for the arts. While federal subsidization has been relatively quite modest, the peer-review deliberations accompanying it and its generally unrestricted character have further stimulated the flow of private support. Yet for better or worse, public subsidization opens the door for politically imposed constraints on artistic expression.

Apart from recognizing that with public subsidies the network of decision-makers widens to include politicians and self-appointed interest groups, artists and advocates of free expression in the arts need to recognize that they cannot have it both ways. Under our system, tolerance of free expression includes tolerance of criticism, boycotts and even arguments for the restriction of particular forms of expression. Depending on the issue at hand, neglect or repudiation of this principle can occasionally be found in almost any segment of the political spectrum. But to quote Garry Wills, "the whole point of free speech is not to make ideas exempt from criticism but to expose them to it."

Finally, it deserves our attention that such a widely ramifying furor is precipitated by a photography exhibit. This medium occupies an ambiguous place; it is perhaps uniquely gripping and persuasive, submerging style and meaning in the immediacy of its subject matter. No small number of its greatest practitioners have chosen to skirt prevailing esthetic doctrines and community standards, focusing on images that the accepted canons of representation and public disclosure would suppress. Given its ubiquity and emotional force, it is worth asking whether photography hasn't been a major factor in pushing much 20th-century art toward an assertion of its uniqueness through abstraction, even while that art still shares photography's frequent preoccupation with the extremes of the human condition.



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Letters to the Editor

Smithsonian horizons

Dear Sir: The incipient move to Washington, D.C. of the Heye Foundation's American Indian art and cultural collection, as reported in Secretary Adams' August column, is a step long neglected. The New York location has made access to this treasure difficult.

Senator Daniel Inouye has not only worked to make this great collection available in our nation's capital, but to establish regional American Indian Cultural Centers as well. (Various cities now have small centers, but they usually cover only one Indian Nation.)

Here in Portland, through our city council and the state, we have authorized a feasibility study for building a Columbia River Indian Cultural Center and Archaeological Repository at Delta Park, on the Columbia River.

We American Indians have lived in this great country for thousands of years. We have respected Mother Nature, creating no pollution. On October 12, 1992, we will have had 500 years of the white man, who has created pollution and acid rain. Now we hope President Bush and Congress will mandate an end to this folly. America should preserve our ability to live with clear skies and clean water, tepees, hogans and longhouses, and our culture of haunting drums, art and singing.

This was the culture of the Great Spirit, of saving our Earth. All future Americans, through the National Museum of the American Indian, will be able to see, in the Native American Indian's spirit of daily living, a goal we all can attain.

Clyde V. Brummell, Chickasaw
Portland, Oregon

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INDULGENT. THE SENSE...

Paul Stewart

Dear Sir: The photograph you used in your Paul Stewart story was not that of Bill Pickett, even though his name was on the picture itself. It is of his cousin Ben Pickett, who was neither a performing nor a professional rodeo cowboy.

An outstanding cowboy, Bill Pickett [below] was the first black to be elected to the Cowboy Hall of Fame in Oklahoma City, Oklahoma, as you mentioned. He is credited with originating steer wrestling, one of the seven standard events in present-day rodeos and the sole event whose origin can be traced to a single individual.

On August 12 of this year the Professional Rodeo Cowboys Association inducted Bill Pickett into their ProRodeo Hall of Fame, recognizing him as one of the greatest cowboys ever. Another dimension of the man is that he appeared in some of the first Western movies, in the early 1920s.

As his great-grandson, I am proud of his exemplary life and appreciative of his worldwide recognition, and would not like his identity confused with that of someone else.
Frank S. Phillips jr.
Silver Spring, Maryland

Dear Sir: What Paul Stewart needs for his museum is the original Folsom Point, which now is kept nearby in the Denver Museum of Natural History. The point is an exquisitely tooled arrowhead found imbedded in the bone of a type of buffalo extinct for more than 10,000 years. A black cowboy led science to the fossil's site. It blew apart the conviction held stubbornly by archaeologists until 1926 that the American Indian came to North America about 3,000 years ago.

After the Civil War, George McJunkin, a black freedman born in 1851 in south Texas, became one of the top-ranking cowboys of the Southwest. As wagon boss for two ranches, he was at one time in charge of a hundred white cowboys.

When a 1908 flood exposed enormous fossilized bones on Wild Horse Arroyo near Folsom, New Mexico, McJunkin knew enough science to recognize their importance. No one he told of his discovery showed any interest, so he added the bones to his collection.

After McJunkin's death his friends Fred Howarth and Carl Schwachheim visited the site and extracted specimens for study at home. In 1926 they sent samples to J. W. Figgins at what was then called the Colorado Museum of Natural History, in Denver. When digging at McJunkin's site, Dr. Figgins found the famed projectile point that proved Man's early arrival on this continent.
Bern Keating
Greenville, Mississippi

Dear Sir: The specially made tool you show on page 66, a sort of socket wrench, is properly known as a "wagon hammer." It removed the large nut that held the wheel onto the axle. Axles were threaded right-handed on one side, left-handed on the other, so that the nut would tighten during travel. A strong tool was required to loosen it.

So the tool would not be left behind, it doubled as the pin through the doubletree and tongue. The wagon could not be moved without it.
Raymond T. Michener
Kennewick, Washington

Barns

Dear Sir: Your article stirred up memories of this urban child's summer visits to Uncle Phil and Aunt Eva's, the family farm in Ohio. Those silver-hot summer days when I was 6 included stealing forbidden visits to the mysterious, life-filled barn with its rags of dirty cobwebs and light columns of vibrating dust motes; skittering, buzzing and flying insects; shadowy birds; warm, snorting, snuffling farm animals; curious, incomprehensible farm tools and oddments; smells of hay, mash, dry corn, manure, motor oil and rust. When I returned a few years ago, the barn roof, walls and

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timbers lay by the roadside among tall weeds, allowed to collapse, I was told, to reduce the tax bill on the farm, whose land was now being rented out by my retired uncle. I shuddered and ached to see that marvelous bulk reduced to a spread of rotting lumber.

I salute those who continue to live on farms, willing to make sacrifices necessary to preserve a heritage, and whose loving care holds these architectural remnants in trust for us all and for those who follow us.
Mary Freed
Richmond, Virginia

Dear Sir: The roof on the Langgaards' barn is a gambrel roof, not a hip roof.

Otherwise, your article was "hip."
Charles W. Wiester
Warner Robins, Georgia

Dear Sir: In my youth in central New York, my first truly secret getaway was a fortress built of hay bales up in a loft. After college, I tried my hand at home remodeling and tore down a few barns too far gone for rehabilitation. Each had a personality of its own, but a thread that ran through them all was the precise fit of the beams. After removal of the pegs, the joints still refused to part. This made tearing down even the most decrepit barn a challenging and occasionally dangerous business.
Neal Miller
Pensacola, Florida

Dear Sir: In Moonshine township, Minnesota, there is an unusual round barn, conceived and erected by "Big Matt" Larson, circa 1911. The structure straddles the Arctic-Mississippi divide, the water on the north side of the building flowing into the Red River of the North drainage, and on the south side into the Mississippi system.

The foundation, 12 feet in depth, is granite on its south side and, on the north, fieldstone. The cupola is approximately 60 feet above the base, and the hayloft will accommodate 300 tons of loose hay.

This round barn is such a local landmark that distances are computed and directions given from it.
David K. Williams
Hacienda Heights, California

Major Esterhazy

Dear Sir: The Dreyfus trial, for which Ferdinand Esterhazy was largely responsible, was covered by many correspondents, among whom was Theodor Herzl, writing for a liberal Vienna newspaper. Herzl, like Dreyfus and many other Jews of Western Europe, was assimilated; he was barely conscious of his Jewishness. But the tide of vicious anti-Semitism unleashed throughout France shocked and overwhelmed him. If this could happen in the birthplace of *Liberté, Egalité, Fraternité*, where could the Jew be safe? As a result, Herzl wrote a number of tracts, books and plays advocating a Jewish homeland, and political Zionism was born. He helped organize the World Zionist Organization, of which he was elected president for several terms before his death.
Morris Stern
Plainview, New York

Lynn Margulis

Dear Sir: Lynn Margulis' work on James Lovelock's Gaia Hypothesis points up

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the folly of mere extrapolation of "conventional" wisdom.

Many of us who have been looking at the acid rain problem have not been satisfied with conventional explanations, for there are many data left over, and rather obvious politicization of the matter. In the Adirondacks, the Southeastern coastal plain, and Western Europe, anomalously high sulfuric acid acidities occur. Lovelock's "Gaia" research has shown that, in Europe, a major sulfur source is phytoplankton blooms in the North Sea, arising from the gross sewage pollution of Europe's rivers. Other culprits are the oxidants of photochemical smog, which oxidize sulfides directly to sulfuric acid.

Here is a powerful argument against the political, simplistic search for an acceptable scapegoat, and an even more powerful one for the freedom of basic, united science to solve scientific problems.
Winslow H. Hartford
Professor emeritus
Belmont Abbey College
Charlotte, North Carolina

Roller coasters

Dear Sir: You mentioned Frank Dinn as the builder of wooden roller coasters—but a builder must work from a plan. His coasters are designed by Curtis D. Summers, a professional engineer, premier designer of wooden coasters. He created the Beast, and his Timberwolf opened in Kansas City, Missouri, this season. Other coasters to his credit include two that will open in 1990 at Six Flags Over Texas and Six Flags Over Georgia.
Wade Atkinson
Cincinnati, Ohio

Dear Sir: I must admit that we felt a little left out because the article failed to mention one of the oldest and most feared roller coasters in the United States, the Cyclone at Coney Island.

Nothing can compare to the feeling one gets on a summer's evening, with the sun setting, from walking up to the frankfurter counter at historic Nathan's and downing a couple of dogs, then taking the short stroll up Stillwell Avenue where, for $3 and no wait in line, you board the infamous Cyclone for a high-speed, rattling, bone-shaking ride into the past.

That's the way to ride a roller coaster.
M. T. Curtin
Brooklyn, New York

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Around the Mall and beyond

"The Intimate World of Alexander Calder" is scheduled to open on the 17th of this month at the Cooper-Hewitt Museum. When I heard the news, in the dreadful heat of midsummer, I seized the chance to go north from the tropics (Washington) to the subtropics (New York). A preview of a Calder exhibit, I knew, would be worth the hassle.

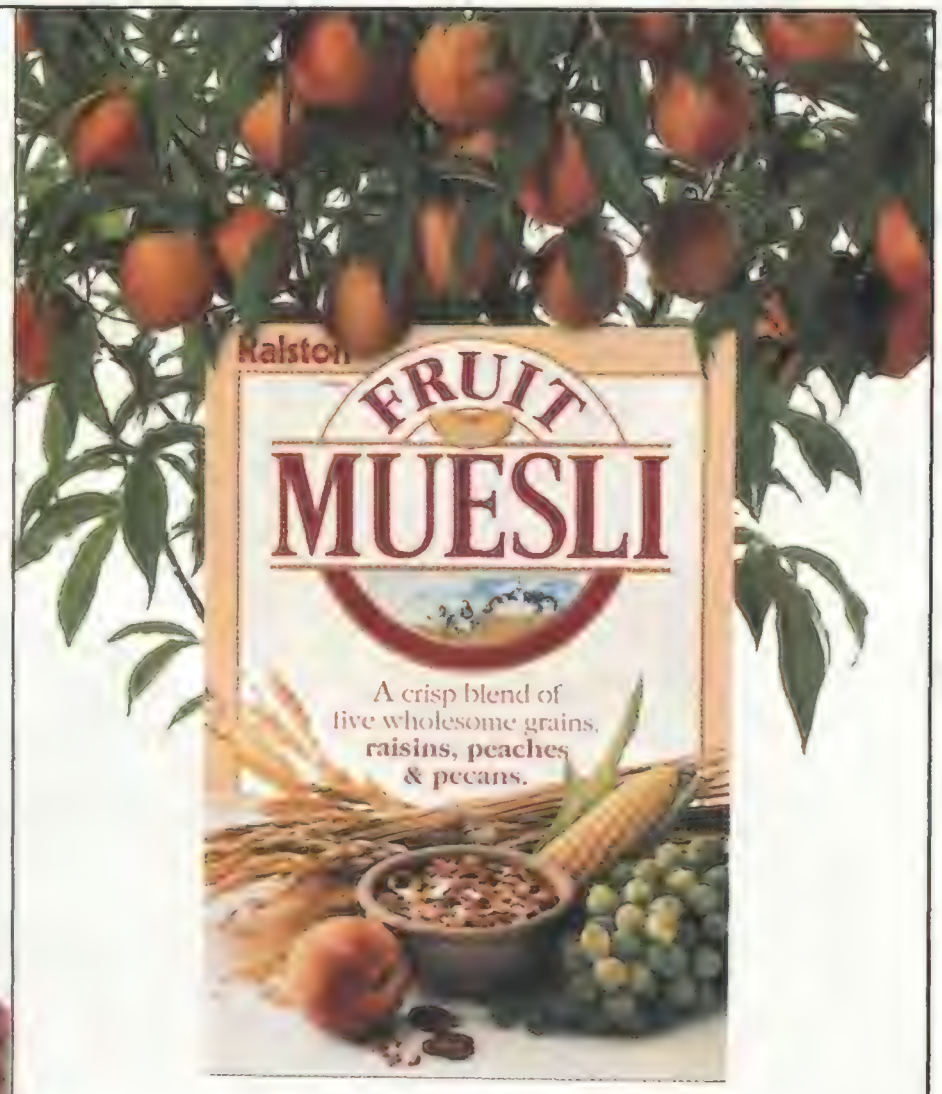
We Americans crave tying momentous labels onto our notable figures. So just saying the name "Calder" evokes a whirl of superlatives. He's been called a giant of creative accomplishment for adding movement to sculpture—the mobiles that are always associated with his name. He's been called "one of the most innovative sculptural minds of the 20th century." And on his death in 1976, President Gerald Ford announced, "Art has lost a genius."

Those are nice round phrases, but they don't really get at the range of Alexander Calder's interests or the versatility of his skills. Born into an artistic family—his mother was a painter, and both his father and grandfather were sculptors—he started tinkering creatively down in the basement while still a kid, fashioning toys, and then devising imaginative games and shows around them for his family and himself. It was all fun. Later, he chose Stevens Institute of Technology at Hoboken, New Jersey, for his college.

Take an artistic tinkerer with a sense of fun, add an engineering education, and what have you got? Mobiles is what. For years Calder built them, small and then great, along with dozens of other expressions of sculpture and design made of scraps of wire, broken glass, bits of metal and wood. More than 300 items are now at the Cooper-Hewitt, necessarily much smaller than the 25-by-27-by-17-foot stabile, *Two Discs*, outside the Hirshhorn Museum. Calder's more personal trinkets didn't bring to my mind the shaggy, bearlike artist in his late and famous years, painting lavish abstractions on a Braniff airlines DC-8. Instead, I came to know a younger, more tentative man who simply couldn't help but create things—beautiful, useful, often amusing, always enjoyable—out of almost nothing. He was one of those special people, like the aunt of your childhood who could carve a twisted root into a galloping horse while, wide-eyed, you danced with anticipation.

Being now somewhat dignified by galloping maturity, I did not twitch and giggle spasmodically at the sight of Calder's work. But I remembered that childhood excitement as Dorothy

Cranberry Cornucopia



Peach Tree

Twining Globus, curator of exhibitions at the Cooper-Hewitt, showed me photographs of some of the items that are now being set up for display in the grand old Carnegie Mansion, the Cooper-Hewitt's home at the corner of 91st Street and Fifth Avenue.

Here were toys, jewelry, sensible laborsaving devices, mementos, kitchen utensils, the film of Calder's famous miniature circus—on and on.

"This is Calder's first major museum show since his death in 1976," Globus said. "It stretches back to his youth. It will remind us of his personal life, his family and friends, his endless sense of fun." She flipped pages in a catalog of Calder's work, as huge and disorganized as the man himself.

The variety of items was numbing. Calder would twist a scrap of wire into tiny spiral earrings, or bend it to spell a name in cursive writing. He used wire as others use pen and ink to sketch a fish, a cow, the head of a friend—part profile, part full-on. And he used pen and ink like wire: one continuous line.

His subjects vary from fanciful (a fish with legs) to mundane (a hand-shape holder for toilet paper). Many items were for his own use. "He liked the bright primary colors on some tin cans," said Globus, "so he transformed them into myriad objects. Here's an ashtray from a can of Italian coffee. There's a doll buggy from one of those bright yellow tins with 'Coleman's Mustard' written on them in red."

A broken wineglass became a table bell. A sheet of aluminum left over, perhaps, from a formal sculpture was curled into a cone, fitted through the side with a wired light socket to become a lamp. Other bits of colored metal or glass found their way into mobiles and jewelry. He often gave small mobiles and jewelry as birthday presents.

"Here's one I couldn't figure out at first," said Dorothy Globus. "It's his handmade toaster. Apparently it worked just fine. And do you know what this is?" She pointed to a picture of a strange masklike object of red cloth, with two wire spirals forming crossed eyes (p. 26). "He called it *Cache-nez*, or *Nose-cover*." It seems Calder made it for his friend Saul Steinberg, artist and cartoonist, who at the time was suffering from a distressingly drippy cold.

"He was nothing if not down to earth," Globus said. She pointed out a child's potty-chair with a curved tin shield in front. "That's for little boys," she explained. "It's removable in case little girls want to use it. Oh, and here's the *Chastity Pin*, a big brooch, really. See the key?"

Calder did dozens of birds—wire ones, tin ones, birds on the ground, birds in flight. "We'll put these on the second floor and let the flying birds hang over that grand stairwell as though they're escaping," Globus said. "Remember, the Cooper-Hewitt has never been afraid of fun."

I pictured the elegant mansion all aburst with Calder's imagination, and realized that this was the first major exhibit put together entirely under the Cooper-Hewitt's new director. With a phone call or two I managed to get an appointment with her.

Dianne Pilgrim, just finishing her first year as director, now looks firmly

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in charge at the big desk on the second floor. She came directly from the Brooklyn Museum, for which she maintains enormous regard: "One of the great museums of the world. Not the United States; the world. But I left it when I was offered this job because the Cooper-Hewitt is our national museum of design, and that's an exciting thought. For me it's a mandate to keep that title in mind and help the Cooper-Hewitt to live up to it."

She's an attractive woman, coolly contained, hinting always of inner strength. A decade ago she was diagnosed as having multiple sclerosis. The big, comfortable chair at her desk is her wheelchair.

All her background in art has pointed her toward this position. Born in Cleveland, schooled at Penn State and the Institute of Fine Arts at New York University, she lived in Washington, D.C. for a couple of years. But for more than 20 years she's been getting along just fine in the Big Apple, and now thinks of herself as a New Yorker.

Being part of the Smithsonian Institution intrigues Dianne Pilgrim. "The Cooper-Hewitt must have a window in Washington," she told me. "We're a national museum, and visitors to Washington should be more aware of us."

What other "musts"? I wondered.

"We must have a journal to discuss design ideas. And I would like to see this national museum of design become a think tank."

Another objective: "Upgrade the garden. How many places in New York have gardens? We should make the most of it, put exhibits in it like the chair show we did last year. It was great.

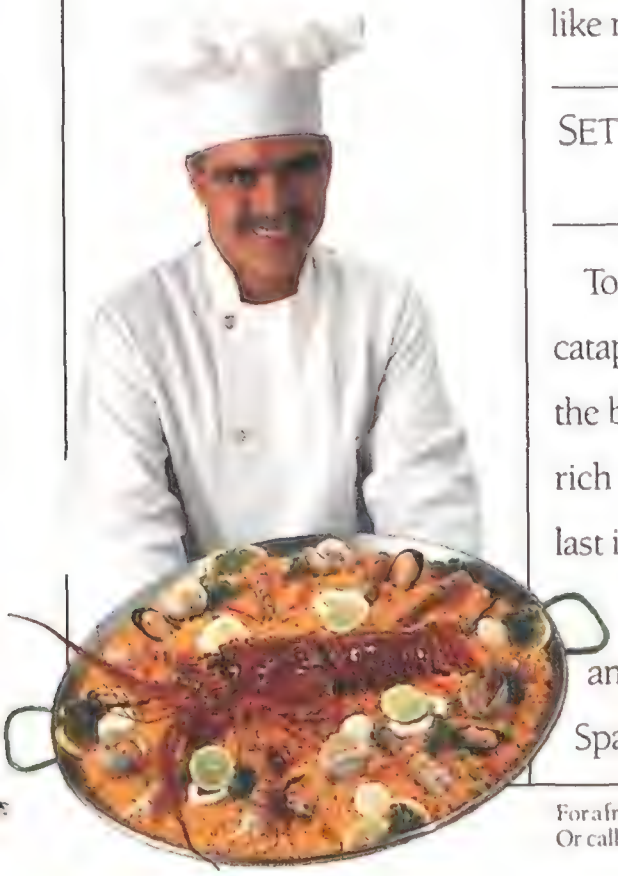
"We're desperate for space," she con-

Calder's *Nose-cover* was a present for Saul Steinberg, who had a drippy cold.

Raul Julia

My Favorite City On Earth

"I know a chef who knows as many ways to cook lobster as there are stars in the sky."



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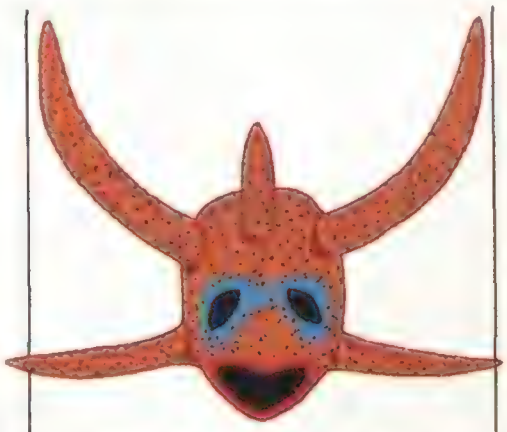

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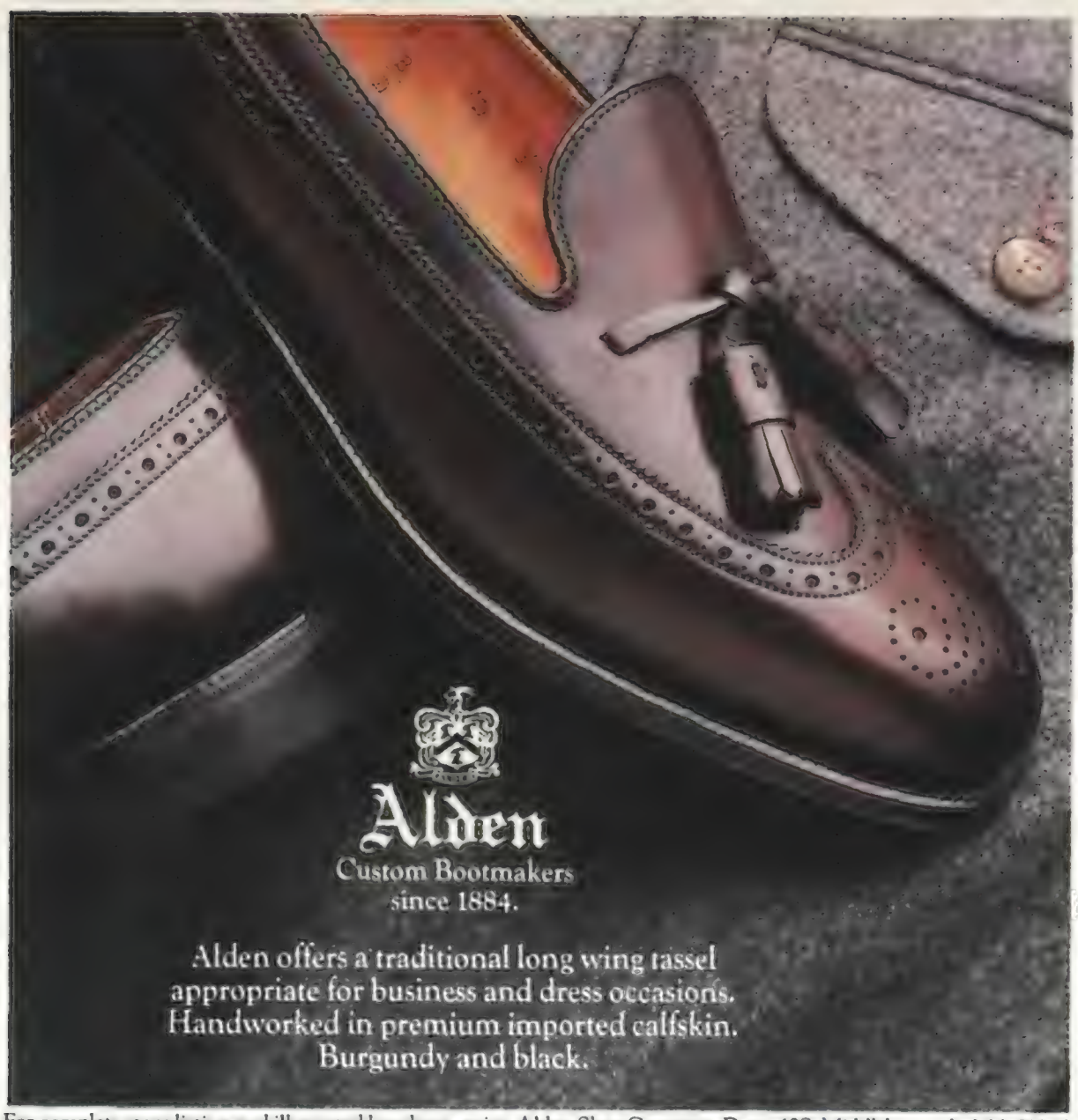

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tinued. "New exhibits now have to be brought in through the front door and if the public elevator's too small, must be carried up the formal stairway. Ideally, this building should display only our permanent collection, and our big special shows should go on display in another building."

In 1919, Andrew Carnegie bought a neighboring 45-room town house for his daughter after her marriage to Roswell Miller. The Miller House shares the view of the mansion's garden, and is used for storage, which is as vital to the museum as funds.

Still, Pilgrim wants to get a permanent collection into an upstairs floor of the Cooper-Hewitt in 1990. "People want to know just what we have here," she explained to me. "We should show them and let them see what design is all about and why we're different from other museums."

Dianne Pilgrim is a distinguished scholar, researcher, winner of an important prize for her work at the Brooklyn Museum, contributor to journals. She's been an adjunct assistant professor at Columbia and served on many boards. When she starts telling you "what design is all about," you listen, for she's not giving you a lesson as much as letting you in on a crusade.

"Everything we touch and use is design. Some of it—art and sculpture—is for pure pleasure. If the rest of it—in industry and everyday living—gives pleasure, that's a real plus. Our lives are enriched. This national museum of design must explain why disparate items are related by their designs, how designs happen. That's been the role of the Cooper-Hewitt since the Hewitt sisters founded it as a teaching museum so long ago."

She paused and looked down at her desk, not exactly a messy desk, but pretty busy. "Right now, in conjunction with the Parsons School of Design, we are giving a masters degree in the history of decorative arts. Actually," she said, "I'd like to see us someday give a PhD in design."

I thought of the Calder items that had so pleased me, and I recalled the words of Dorothy Globus as she described how Calder's devices reflect the fun he had making them.

Fun along with PhDs. A good mix for a splendid old museum.

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Let's dig a little deeper into the notion that much of our garbage is made up of plastics.

America's growing waste problem is monumental. We generate 160 million tons of garbage a year.

Our nation's landfills are being filled up. In five years 2,000 of our remaining 6,000 landfills will be closed.

A lot of well-intentioned solutions are being offered. One is that foam plastics, plastic bottles and plastic packaging should be banned.

The fact is that plastics make up less than 8%, by weight, of our nation's waste. Paper and paperboard make up about 36%, glass and metal about 9% each, all by weight. Plastics are naturally lighter, but still, when compressed, account for only about 20% by volume.

If plastics were banned, the need for packaging wouldn't go away. The idea is to substitute other materials which are assumed to be biodegradable, so a landfill would take longer to become full. Studies show, however, that paper and other materials decompose so slowly in today's landfills that the lives of the landfills are not extended.

Recycling must play a part.

In addition to environmentally secure landfills, and more state-of-the-art waste-to-energy incinerators, we believe that a significant answer to America's waste problem lies in recycling. Everything recyclable should be recycled. Yard waste. Paper. Metal cans. Glass bottles. And plastics.

Although plastics recycling is in its infancy, plastics are potentially more recyclable than alternative packaging materials.

In South Carolina, one company recycles 100 million pounds of 2-liter plastic soft drink bottles a year into everything from fiberfill for ski parkas to scouring pads to automobile distributor caps.

In Chicago, another company processes 2 million plastic milk jugs a year into thousands of boards of "plastic lumber" for boat docks, decking, park benches and fences.

In Tennessee, another company processes plastic containers into bathtubs, shower stalls and sinks.

What Amoco Chemical is doing.

Amoco Chemical is playing an active and meaningful role in recycling.

We're sponsoring a demonstration recycling program in New York State showing that used polystyrene foam food service containers from schools and restaurants can be recycled into products like insulation board for commercial construction, cafeteria trays and home and office products.

We're participating in a consortium with other major plastics manufacturers which will support construction of regional recycling plants as part of a nationwide attempt to increase the recycling of polystyrene.

In Portland, Oregon, we renovated a 10-acre environmental learning center with a new wetlands walkway, signs, kiosks and benches made from recycled plastics partially collected from local recycling programs.

We're encouraging the start-up of new plastic recycling efforts, we're helping to find new ways to collect and sort recyclables, and supporting efforts to create markets for products made from recycled plastics.

At Amoco Chemical, we believe we're only beginning to see the benefits of recycling. In the not-too-distant future, it can turn our solid waste from a national problem into a national resource.

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Phenomena, comment and notes

The unthinkable happens when an addict must dispose of books that meant a lifetime of doors opening

We live in the Information Age, the thinkers tell us. Hardly anybody actually makes anything anymore. Instead, a few produce information and the rest of us spend our time analyzing it, massaging it, breaking it down and then putting it back together. Most of all we move it around; we FedEx it, we fax it, we bounce it off satellites. But when we are not batting it back and forth as radio waves or microwaves, or shoving it through copper wires or optical fibers, it has to sit somewhere.

Back in the dark ages, about 25 years ago, information sat on paper, little squiggles of dried ink. All we needed to retrieve it were our built-in autofocus optical scanners. The paper in turn was stored in file folders or in messy piles on desk tops. Documents of certain size were bound together in books. Nowadays much information sits invisibly on magnetic tape and floppy disks, requiring arcane incantations to make it appear. But it still has to sit somewhere.

The "new literate" talk about data bases, information storage and retrieval, local area networks. Their language is analogous to that used by the ambitious souls who study the brain, a device with enormous random-access-memory capacity but notoriously poor retrieval capability. Large organizations are most at home in the new age. They have the hardware and the people to do it. The Smithsonian Institution has a whole division known as the Office of Information Resource Management. We all should have one. At the magazine we are not quite as far along, relying more

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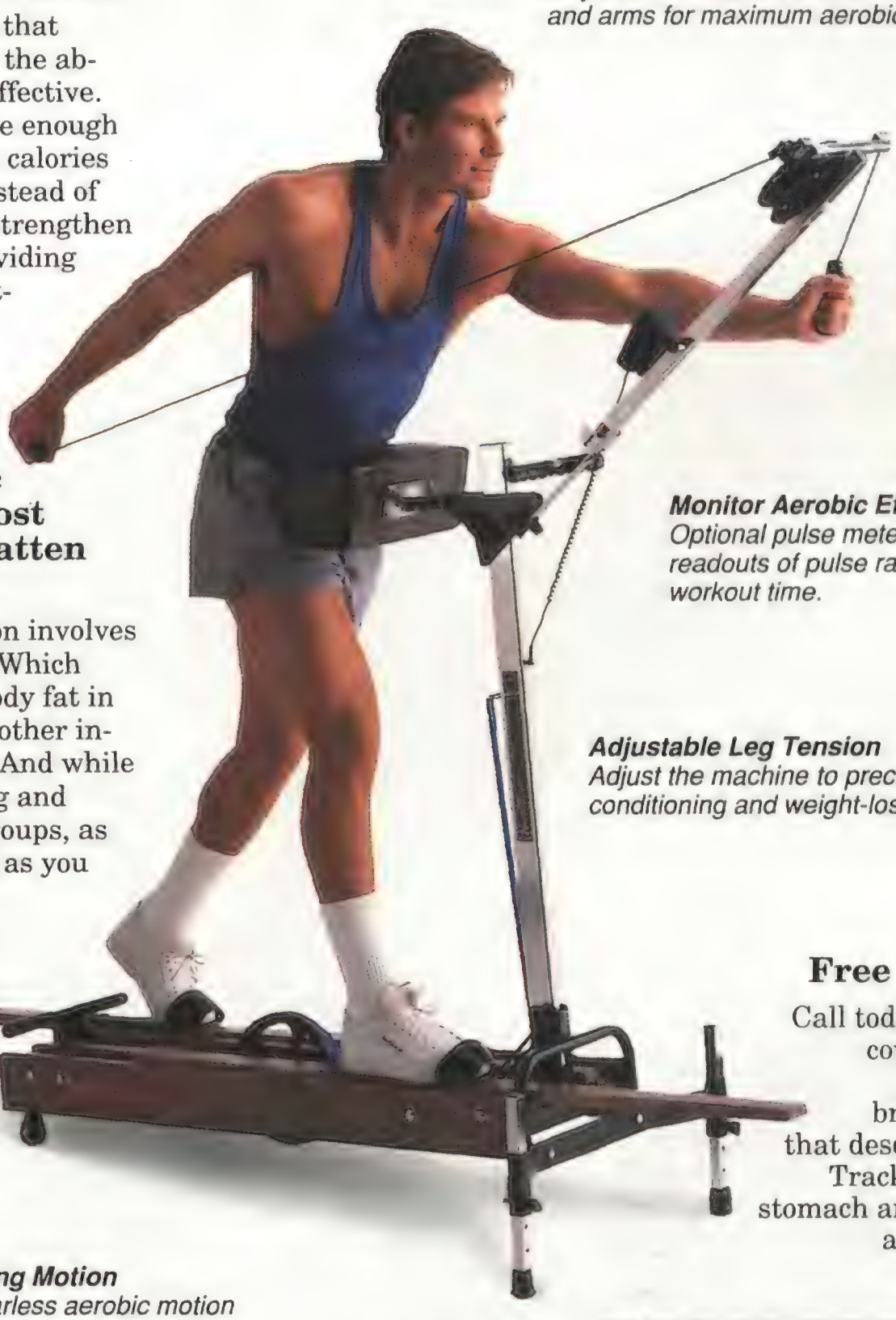

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For most of us as individuals, however, the Information Age is only something we read about, in dried ink on thin sheets of wood fiber and rags. In most homes, paper is still king. Books on the wall, files in drawers. And now I find myself facing an information crisis. In the process of moving from a seven-room house to a one-bedroom apartment, something has to go. My data base is too cumbersome for my own new age. It is hard enough giving old clothes—old favorites, each with a history, stories to tell—to Goodwill. It is not so hard to get rid of the broken chairs, the dresser that was a stopgap 30 years ago.

What is really the most personal, the hardest to discard, is information, the particular information gathered painstakingly over decades that represents the interests of a life. Folders of information about groups no longer belonged to: the American Association of Variable Star Observers, the Association of Lunar and Planetary Observers (unfortunate acronym and all), the American Meteor Society. Once a member, always a member. Throwing these pieces of paper out seems as cold as throwing away old love letters. Then there are the fat folders from the Natural History Stamp Company, a mail-order enterprise that produced only that artifice of modern society, a tax write-off. It means throwing out hundreds of nights at the big table, filling orders, sorting stamps, filling out mail-auction bids. It dims the memory of the never-ending surprise that strangers would actually mail checks—that always cleared—to someone they had never heard of.

For someone in the business, magazines are a special problem. I only kept them for the kids' school projects, of course, except that I kept on doing it long after the kids had moved on. Old *Audubons*, beauty on heavy, coated stock; older *Commonweals*, ideas printed on newsprint; the bright yellow covers of an English-language monthly published across town: there was something of consuming interest in each and every one. Now they go into boxes for the trip to an unsuspecting hospital.

Finally comes the unthinkable, the unspeakable: How does one "get rid of" books? In that house they filled the built-in shelves, the bookcases in every room, the windowsills; they were piled high on radiator covers and guest-room couches. Books lay in toppled piles on the floor of the den and the bedrooms, dropped by easy chairs and under beds. More waited in exile in the cellar. They are objects only in the sense that a picture of a beloved is an object.

Perfectly respectable from the outside, that house was a den of addiction. Money that wiser heads would have put into real estate syndicates or his-and-her Jaguars went instead for books. But who is so dead that he can walk into a bookstore on payday, vaguely looking for something half-remembered from the Sunday review sections, and not come across something else that he simply must have if he is to find happiness in this life? Who can spend a couple of hours on a rainy afternoon in the upstairs back room of a used-book store in a little vacation town and not find enough unexpected delights to walk out with half a dozen bargains, some of

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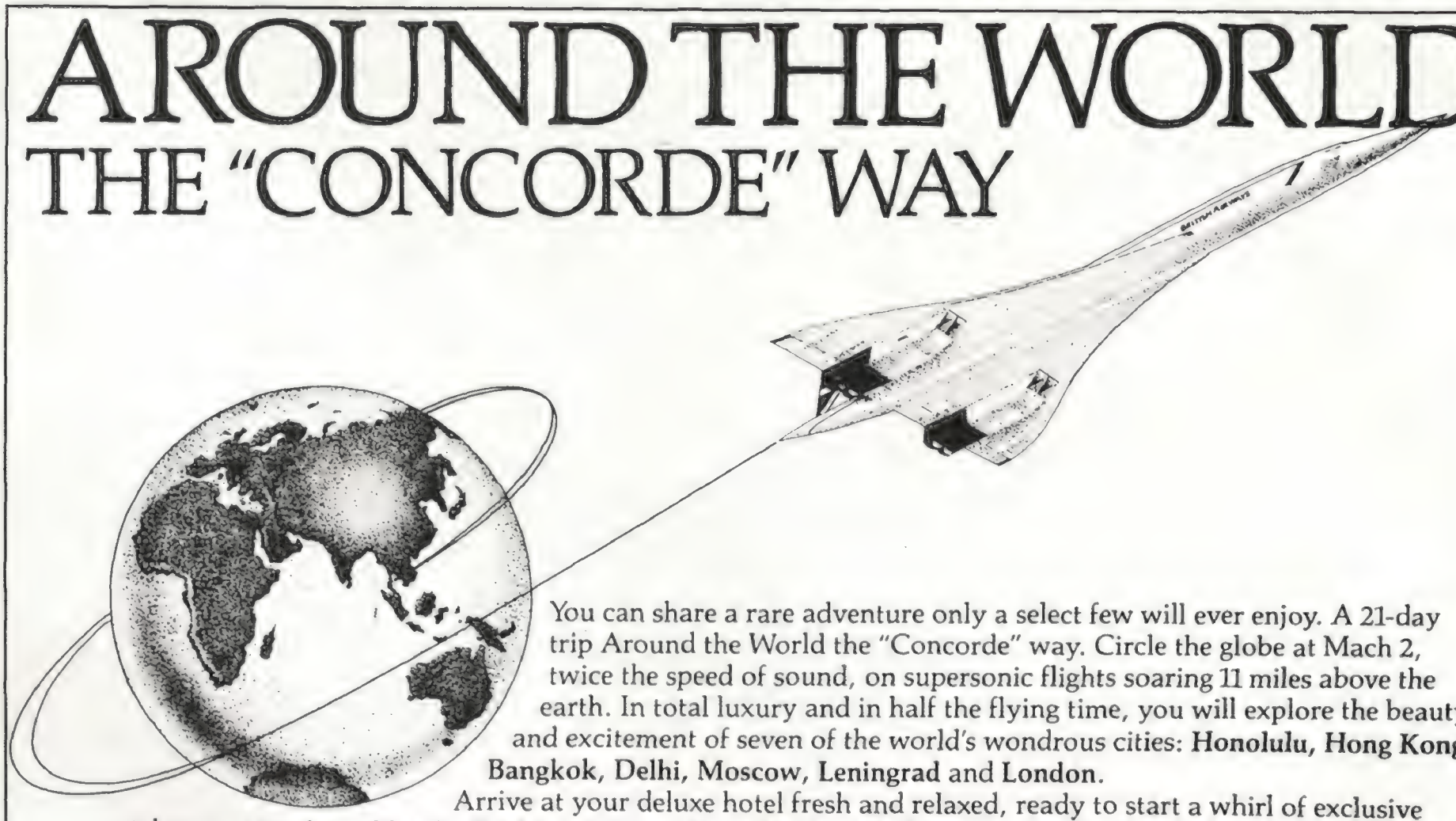

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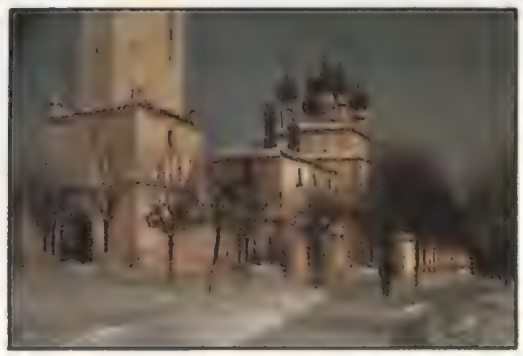
Some treasures are buried, oddly, under low prices. Example: a pair of 18th century portraits recently sold in Dublin for £1,600. The buyer knew *instantly* (the seller obviously did not) that they were by Gainsborough and worth £150,000.

There is no magic formula. All that is needed is an "eye." Some have it, some don't. The same buyer, with quite a good eye, went on to buy a little watercolor for £85 which was, of course, a Turner worth a fortune. Earlier he bought a Fusell for £8,000 which sold for £350,000.

I myself bought two shards of Ming porcelain recently which had been retrieved from a ship which sank off China 400 years ago. The price I paid was too *low;* that didn't stop me from buying them. Nor will the fact that they are worth much more cause me to sell them.



The ancient village of Palekh now. Unchanged. Unhurried. And still creating miniature "miracles."

Treasure is my business. I search the world not so much for the single treasure, but the tiny part of the world where more than one such sleeping treasure may exist.

The ancient Russian village of Palekh, in my opinion, is such a place. Artists there have an "eye" not for uncovering masterpieces, but for creating them. Using techniques handed down for 600 years, they compress human emotion with great accuracy and power, and with exhausting concentration, into just a few square *inches*. You must see the result for yourself. The price is quite small; do not allow this fact to deceive you into thinking it therefore cannot be a masterpiece.

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which will even be read? Who does not feel a never-to-be-admitted blush of virtue, a feeling that you have enlisted in the quest for truth and beauty by making it possible for a bookstore, a writer, a publisher to survive one more day? An insatiable desire to own books as well as read them is a harmless madness. But a day of reckoning finally comes, when years of impulsive purchases must be culled. It's like giving away your children.

Let us begin with first principles. No civilized person would actually deposit a book in the trash unless it was *a*) a trash book in the first place, *and b*) it had been the victim of rain, fire and an extremely ill cat. One does not put American flags in the trash, nor rosaries, and one does not simply throw out individual units of the best information storage system of the past 500 years, the quantized repository of all human history, knowledge, culture, art, aspirations and dreams. If one has grown too dim to use them, one passes them along to someone who can.

Some had to go, either to a secondhand shop (even that seemed crass, like accepting money for being virtuous), picked up by a fast-talking scuba diver in a black Mercedes convertible; or, less sinfully, to a college fundraising book sale, picked up by a pleasant matron in a station wagon who wheeled her handcart like a warehouseman. But which books had to go? How do you line up your friends, some you've known since childhood, and walk down the row, saying: "You. You're out . . . and you . . . you, too. . . . Sorry, old buddy, you're outta here. . . . Sure, it was special, but you're history."

An August of nights at the dining room table, books in piles of six or eight, deciding, deciding, moving books from one pile to another, putting them in the "sell" box, in the "give away" box, taking them out again. Looking for favorite passages, reading inscriptions from grandmothers long gone from this world. Bursts of cold-eyed decision making, long periods of reverie. Picking up an old book that once meant a new and deeper appreciation of the possibilities of life is very much like getting a whiff of a perfume that once meant everything.

Some decisions were weighty. Take the eight boxes of bound *Good Housekeeping*s, the complete set from 1912 to 1929. My grandfather had written a column for them (column-writing may be a hereditary affliction; someday prospective parents will be able to have themselves tested). For 20 years I had dragged them from house to house, thinking that some quiet winter I would read them all, but I never did. A library somewhere will have the set when the time comes; these have to go.

It was always my fantasy that someday I would be retired, living in genteel poverty in a large old house on a body of water. Books would line the walls, there would be lots of couches and easy chairs, with floor lamps and tables for teacups, and at last I would spend a good part of each day reading all the things I had never had time to read—all, say, of W. H. Hudson, the Argentine-born Britisher whose books (especially *Far Away & Long Ago, Green Mansions* and *Tales of the Pampas*) I love, in a reversal of the arrow of time, even before I have read them.

But reality does intrude. Unless I

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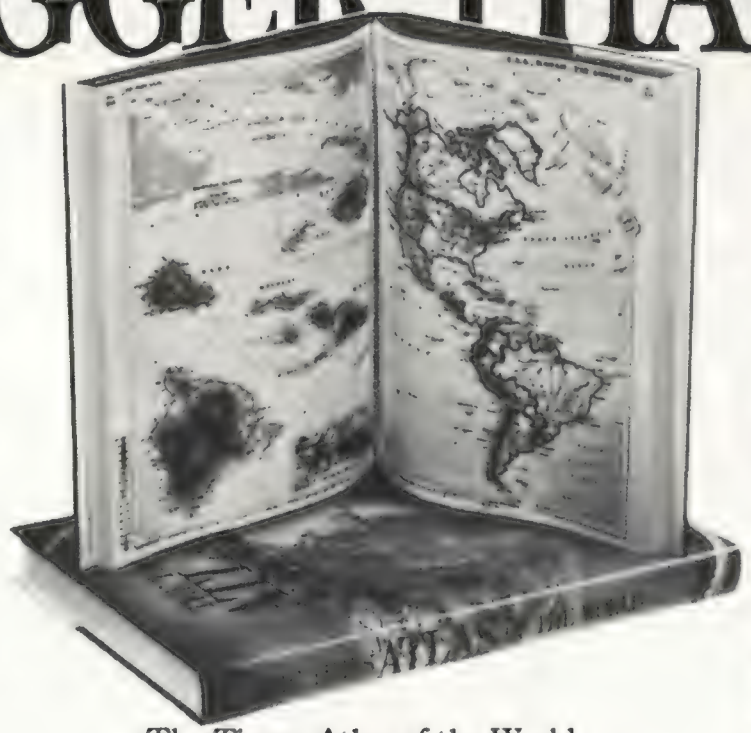

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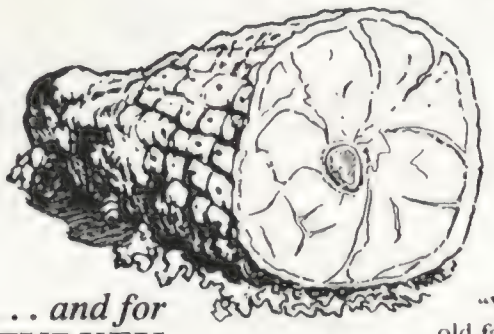

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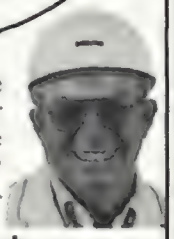

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have the good fortune to be run over by a city bus, and thus gain both reading time and cash toward an early retirement fund, that book-lined house on the water is just a little farther away than Mars. Meanwhile, time is running out, and space already has. The apartment will be the information equivalent of a biologically impoverished oceanic island. I feel like the man banished to a desert island and allowed only one book. (His obvious choice? *Practical Shipbuilding*.)

Rhetorical exaggeration, of course. The field guides will be there. The ecology texts. Bent's life histories of North American birds. So will the single-handed passages around the world of Alain Gerbault and Francis Chichester. The comic adventures of Colin Glencannon, chief engineer of the *Inchcliffe Castle*. The paradoxes of G. K. Chesterton. The impenetrability of Thomas Pynchon. And most of all the pantheon: Edward Abbey. Loren Eiseley. David Ehrenfeld. Aldo Leopold. Barry Lopez. Mary Midgley. Henry David Thoreau.

So here I am, leaner and meaner, older and sadder. My files have been purged, as they say nowadays. My hard disk has been cleaned up, my subdirectories simplified. Down from megabytes to kilobytes. I feel like a modern-day correspondent who has had to turn in his laptop, his modem and his tape recorder, and go out with nothing more than the classic tools of the trade, a few sheets of 8½-by-11 newsprint folded in thirds and a No. 1 pencil.

To my surprise, I feel liberated as well as impoverished. This is also the age of the information explosion, we are told, in which specialists cannot keep up with their own fields. Nobody can keep up with it all. My house was a little like those NASA warehouses full of computer tapes, scientific data telemetered back from satellites and space probes, that no one has the time or money to analyze. It's not all bad to empty one's warehouses of impossible goals. It feels good to travel light. Yet there lingers at the core the unrepentant sinner, who knows that someday temptation will come again: a house with acres of empty walls, books that exactly match one's current course through space-time, the sensuous heft of boxes of new file folders. If a little denial heightens later pleasure, how can you lose?

John P. Wiley jr.

1/6/89

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George Heye scoured the Western Hemisphere for arts of the Indian; the Smithsonian awaits their coming

Viewed from the street, the imposing neoclassical building, ringed by a six-foot-high band of dense graffiti, seemed an anomaly in this west Harlem neighborhood. Now, inside, Roland Force, director of the Museum of the American Indian, was giving a tour of the exhibits. "This war club was Sitting Bull's," he said, pointing through the glass at a confusing jumble. It was difficult to pick out the club. He led the way around a corner. "This tomahawk belonged to Tecumseh," he continued. Again, one had to search to find it, and he noticed. "We know these cases are awful; I make no apologies for it," he added distractedly. "Our exhibitions are so crowded as to be almost meaningless —it's like looking in a pawnshop window."

Force's comments, made two years ago, neatly summed up the dilemma that has faced the trustees of the museum for decades. What do you do when you have one of the world's largest and finest collections of Indian artifacts from North, Central and South America (SMITHSONIAN, August 1978), and you can't provide it with an adequate home: enough space, an accessible location, reasonable funding? It's not a new problem for the museum, which was overcrowded as soon as the building opened in 1922. Fueled by a fortune inherited from his father, a Standard Oil executive, founder George Heye had already amassed 400,000 items. He had done much of the acquiring himself, particularly in the West. Sometimes he descended on an Indian reservation in his chauffeur-driven limousine and bought everything in sight.

The overflow was put in a Bronx warehouse 12 miles away. Today its vaults, shelves and drawers are densely packed with the likes of Northwest Coast masks, painted garments from the North American plains, figurines from the Maya civilization, prehistoric arrowheads. The photographs on the following pages suggest the range and beauty of this spectacular collection, now numbering a million items, which relatively few have seen: the buildings, off the beaten path and separated from each other, exist in a sort of museum limboland.

In the 1970s, the trustees of the museum began seeking a solution in earnest. Soon they found themselves embroiled in a series of dramatic turns, political fights and lawsuits. Some of the ideas that were explored would have kept the collection in New York. Although Heye had stipulated that the museum must remain there, the trustees were willing to consider almost any option that would keep the collection intact. There was talk of relocation to other cities, including Las Vegas, St. Louis and Dallas, where H. Ross Perot offered generous funding and a brand-new facility. But nothing worked out.

Then, earlier this year, after months of negotiation, agreement was reached between the Museum of the American Indian and the Smithsonian Institution. If the necessary legislation passes in Congress this fall, and the New York court agrees—both of which appear likely—the Smithsonian's 15th museum will be the National Museum of the American Indian. It will be housed on the Mall in a new building that will open in about six years, with an additional facility for exhibitions and other programs in part of the U.S. Custom House at the southern tip of Manhattan.

In an outdoor ceremony last May, overlooking the site where the proposed building will stand, Smithsonian Secretary Robert McC. Adams signed the agreement between the two institutions with an energetic flourish. Everyone present exuded optimism, from Roland Force and the trustees of the Museum of the American Indian to Senator Daniel Inouye, chief sponsor of the legislation in Congress. Dick Baker, a member of the Lakota Sioux Red Feather Society, offered a prayer for the museum's success. But perhaps the most memorable comments were offered by Representative Ben Nighthorse Campbell, the only American Indian member of Congress. The museum, he said, will be a "rebirth for us. Our people across the country know the importance of this."

Constance Bond

Photographs by Rosamond W. Purcell

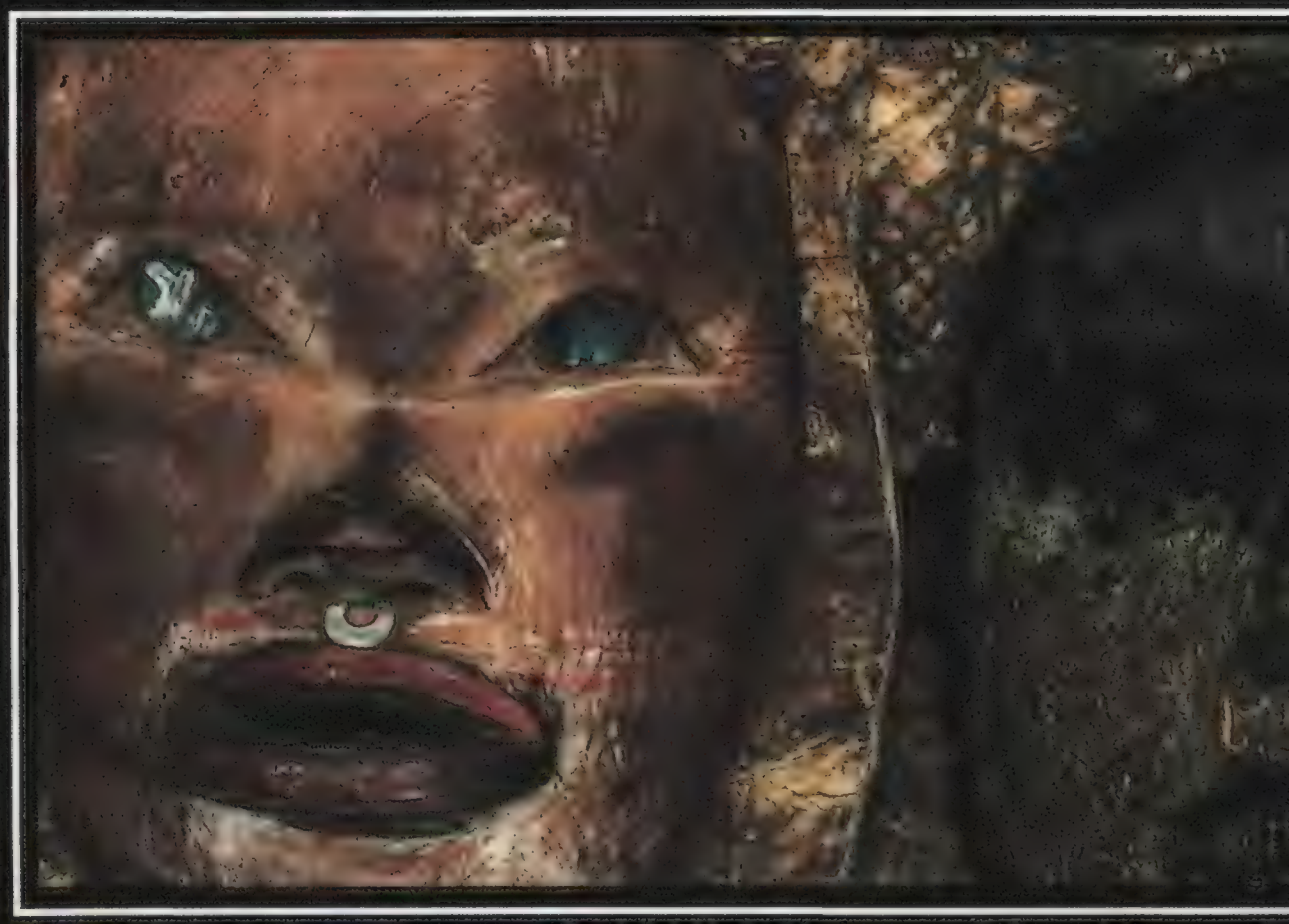
Ceremonial headdress of dyed feathers and horn was used by the Comanche in Oklahoma a century ago.

Wooden war club, carved in the form of a hand holding a ball, was used by the Seneca in western New York against their enemies.

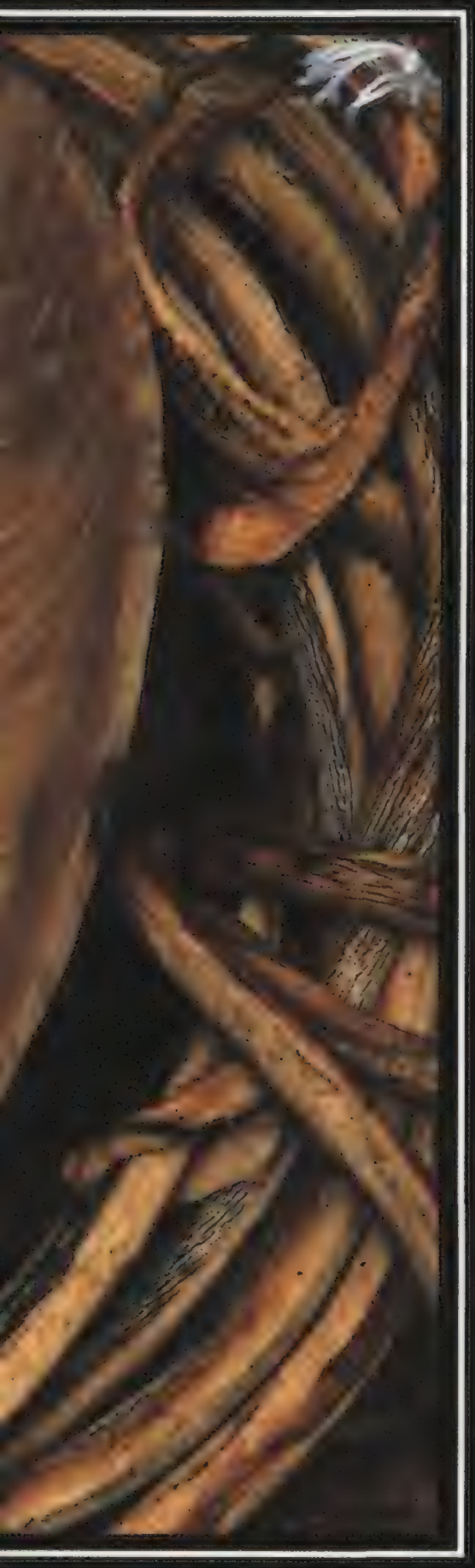
Macaw-feather headdress was added to Heye Collection in 1906.

It was fashioned by the Jivaro Indians of Ecuador.

Warshirt from the Sans Arcs ("Without Bows") tribe of the Teton Sioux probably dates from early 1870s; Battle of the Little Bighorn (1876) was tribe's last.



A shaman wore the mask with mother-of-pearl; mask at right shows the effects of weather. Both are Tlingit.



Copper Inuit, Northwest Territories, crafted ladle and spoon from musk-ox horns, the lashing from beluga hide.

Inuit animal-headed bag has glass beads that may have come from Bohemia by way of trade across Bering Strait.

Pre-Columbian two-headed figure, from Northwestern Coast culture of Mexico, may have been a grave offering.

An eagle- and hawk-feather bustle was once worn by a "fancy dancer" of Southern Cheyenne in Oklahoma.

Game set—with wooden-bowl playing surface, five bone dice and seed counters—was made by the Winnebago of Nebraska.

Prehistoric pottery pipe was unearthed in Miami County, Ohio; it can be attributed to a moundbuilding culture.

Moccasin with quillwork trim, and a roach that was worn on top of the head, are both Delaware.

Arrowheads and spear points in this group were found in Ohio; all are thought to be prehistoric.

Rattlesnake surrounded by shell inlay is on a prehistoric serpentine pipe from California.

Below: It took more than a year for a Pomo in California to weave this ceremonial basket tray.

The meaning of the design on this Crow warshield cover was known only to its owner, who painted it on.

Apaches made music with fiddle and bow (left), and a pair of rasps was used to mark a song's rhythm.

Hole was made in Mimbres bowl (c. A.D. 1100) to "kill" it, releasing its spirit before grave burial in New Mexico.

This prehistoric Maya pottery jar with a human head in relief may have been used in some kind of religious rite.

The power of Alaskan Inupiaq ritual is evident in this five-inch-long model, which depicts a shaman's ceremony inside a *kazigi*, or men's house. Drummer and singers are joined by armless figures, which may represent the spirits of the dead.

Anti-nuke protesters line the bridge at Hood River, Oregon, as the shrouded reactor is barged upstream.

By Seth Shulman

When a nuclear reactor dies, $98 million is a cheap funeral

The Columbia River was the final leg of the 8,100-mile, two-month journey from Pennsylvania to burial.

The Department of Energy buries the first commercial nuclear reactor, but 50 more are about to die—and there's no cemetery

The mighty Columbia River carves its way through the Cascade Mountains of the northwestern United States to leave a massive swath of running water dividing Washington and Oregon. Standing on its gorge-ridden banks, one cannot help but feel humbled. Every day the Columbia irrigates seven million acres of land and delivers a steady surge of electricity to the entire region, as well as to parts of Los Angeles, nearly a thousand miles away.

Today, the river's quiet power is especially striking as a tiny dot of a barge called the *Paul Bunyan* peeks over the hazy horizon. It is hard to believe that the barge, flanked by tugboats and dwarfed by its surroundings, totes a thousand-ton payload. Over its 30-million-year history, the river has never known the likes of this barge's cargo. On board, like a huge sepulcher, is the spent reactor vessel from the world's first commercial nuclear-power plant.

A milestone for the nuclear industry

Almost silently, the *Paul Bunyan* navigates the last leg of what must rank as one of the world's longest funereal journeys. Setting off from the outskirts of Pittsburgh, Pennsylvania, the nuclear remains have traveled down the Ohio and Mississippi rivers, into the Gulf of Mexico, through the Panama Canal, up the Pacific coast, and now inland on the Columbia en route to an earthen burial in a trench on the Hanford Military Reservation (pop. 30,000) in southeastern Washington.

Beyond even the impressive 8,100 miles logged, though, the barge voyage represents a significant milestone for the nuclear industry. Shippingport, the nuclear reactor whose spent core now lies atop the barge, was the cornerstone of President Dwight D. Eisenhower's "Atoms for Peace" program. Built in 1957, Shippingport ushered in the age of commercial nuclear-power generation. Now, fittingly perhaps, the Shippingport reactor vessel's final voyage also hails a new chapter for nuclear power. Its demise is being used by the U.S. Department of Energy as a model project to show the world that nuclear reactors can be shut down and torn apart safely.

Until recently, this was not a pressing issue, given the more urgent (and as yet unsolved) problem of how to dispose of a nuclear reactor's fuel rods, which can power a reactor for only about three years. The spent fuel rods—the most highly radioactive entities known on the planet—are still the major problem on the industry's hands, and it is worth pausing for a moment to contemplate their nature.

The fuel for a nuclear reactor is made up of small pellets of uranium poured into thin metal rods 12 feet long. Each full-size reactor holds roughly 40,000-50,000

Color photographs by Phil Schofield

of these pencil-thin rods, wrapped in groups called fuel assemblies. Every year, approximately a third of a reactor's extremely radioactive rods need to be disposed of. The rods are said to be "spent" but, actually, during their time in the reactor they have become far more radioactive than when they were inserted.

In the United States, the spent fuel from commercial nuclear-power generation—now totaling some 22,500 tons—is nearly all stored temporarily in water-filled cooling ponds adjacent to the nation's reactors. Many of these ponds are already filled to capacity, but more waste than ever is currently being generated; its volume is expected to double within the decade. And the proposed high-level waste repository deep inside Yucca Mountain in Nevada is still far from ready to receive it.

Everyone knew, of course, that in the long run the reactors themselves, with their roughly 30-year operating life spans, would eventually face the retirement quandary: at least 50 nuclear power plants in the Western world will reach retirement age within the next decade. About a dozen U.S. reactors are ready now for decommissioning, a process that formally terminates a nuclear power plant's operating license and is supposed to clean up residual radioactivity, leaving the site safe for other uses.

Indeed, the problem of disposing of all wastes from nuclear reactors, military as well as commercial, has lately become a matter of nationwide planning and controversy. Currently, federal law calls on states to create regional or individual dumps for "low-level" waste (which can run the gamut from relatively harmless to absolutely lethal) by 1993. The selection process has sparked growing "nimby-ism" ("not in my backyard") as Americans discover, according to one recent report, "that nuclear waste is coming soon to a dump near them." High-level waste from military sites, except for spent fuel, is destined for burial near Carlsbad, New Mexico, although there is much controversy over the site (see sidebar, page 66). And the spent fuel from both military and civilian reactors awaits a tomb tunneled into Yucca Mountain, a site scientists are also questioning (it lies between two prominent earthquake faults and 12 miles from a still-young volcano).

At Hanford, a night crew uses cutting torches to free reactor vessel so that it can be pulled ashore.

Today, however, 32 years into the age of commercial nuclear power, Shippingport provides a firsthand glimpse of what is actually entailed in the process of

The reactor pressure vessel rests on a 320-tire trailer, which was welded to the barge for the long voyage.

decommissioning a nuclear plant. It signals, too, that many daunting challenges still lie ahead as we face the prospect of eventually dismantling the more than 500 reactors now on-line or under construction worldwide.

In this context, a moment of history is marked by the *Paul Bunyan*'s arrival. On a hot and dry Wednesday last spring at a gravel-strewn dock on the outskirts of Richland, Washington, in the remote southeastern corner of the state, a scattered crowd of about a hundred have meandered by on their lunch hour. Some workers from the nearby Hanford Military Reservation have a small office pool under way, a friendly competition to bet on the precise time the barge will dock. Except for the local television cameras and special federal police, it looks hardly like the history-making scene that project manager John Schreiber will assure you it is.

The *Paul Bunyan* docks at 1:20 P.M., and almost immediately a team of workers with blowtorches at-

Before the reactor is unloaded, a crane removes its shroud so inspectors can check on its radioactivity.

tacks the pedestal of the reactor vessel to unweld it from the barge. Officials from Washington and Oregon climb onto the platform with hand-held Geiger counters to take surface measurements of the low-level radiation that the vessel is emitting. Schreiber hustles down to the guarded dock area to join the action. He has spent the past few days following the barge along the Columbia's shore in his black, rented sedan, hopping out in the heat every few miles on banks and bridges to check the progress. His forehead is red from the miles of sun-beaten surveillance and it adds somehow to his marinelike appearance. For Schreiber, the barge's arrival is a tangible culmination of the Department of Energy's five years of work on the project. From here the vessel has only to be brought some 30 miles overland to its burial on the Hanford Reservation. "Shippingport shows that we can decommission nuclear power plants safely," Schreiber will say later, "with standard tools and with radiation exposure to the workers well below acceptable standards." For now, though, he is consumed with the details accompanying the *Paul Bunyan*'s landing.

Although he is not focusing on it now, Schreiber has taken a good deal of criticism for some of the choices made by the Department of Energy in the Shippingport project. Some critics see the reactor vessel's lengthy voyage to a military dumpsite as an embarrassment, only underscoring the siting obstacles facing the disposal of future commercial reactors. At present no civilian site in the United States is willing to take such nuclear debris, and Hanford was available only because of the government's oversight of this unique pilot project.

Many also question the Energy Department's decision to ship the nuclear reactor vessel in one piece. Shippingport, at 72 megawatts, was a relatively small reactor. Decommissioning a full-size, 1,000-megawatt, modern commercial reactor, according to many experts, will almost certainly require carving the vessel into smaller pieces, a problematic and high-radiation-producing step that the department notably managed to avoid in Shippingport's decommissioning—taking some of the shine off Schreiber's sweeping claims for the project.

But now is a time when Schreiber understandably takes a good deal of pride in his work. Despite everything, the job is on schedule for its 1990 completion and is even slightly under its $100 million budget. The

Seth Shulman is a freelance science writer and the Boston correspondent for Nature. *He is working on a book about toxic wastes generated by the military.*

A line of big trucks in tandem, weighted with concrete for traction, struggles to tow 1,000-ton load uphill.

Hanford workers and their families gave the reactor the first—and the only—warm welcome it received.

project has managed to avoid any large-scale catastrophes and has weathered countless minor debacles. "We do wear a belt and suspenders," Schreiber says, "although no one gives us credit for it."

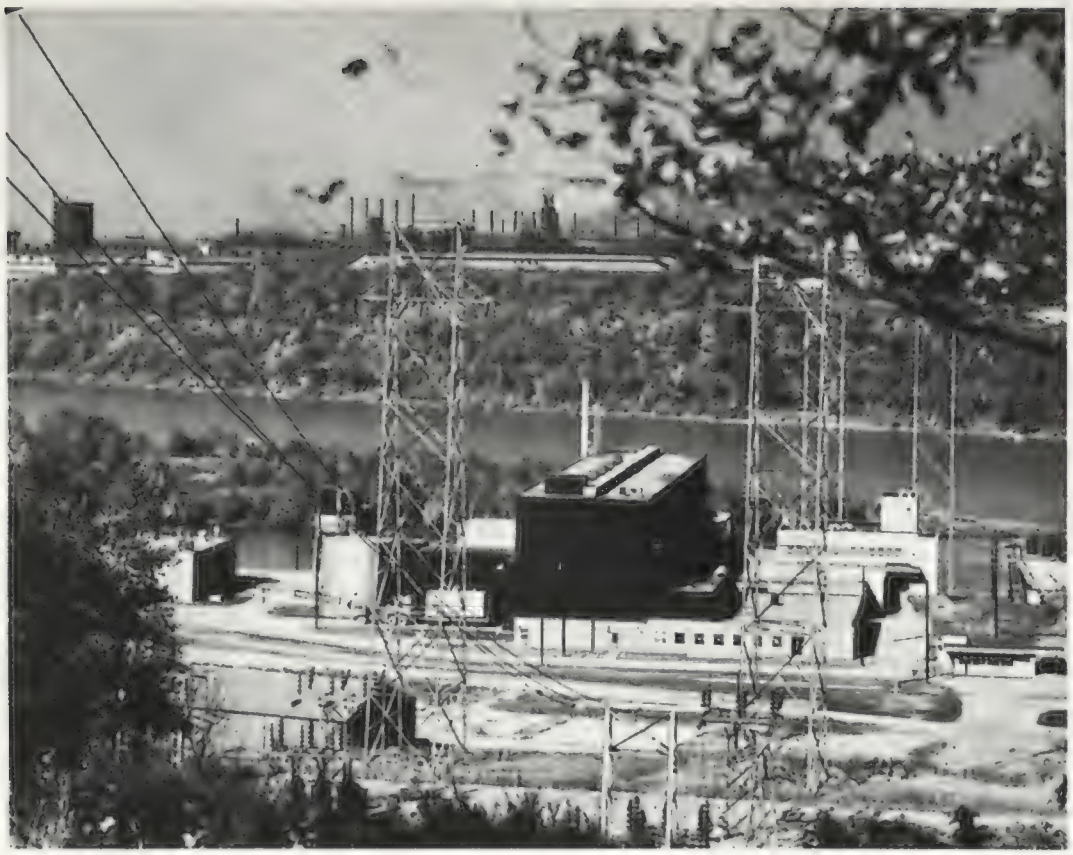
Only a few bright streaks against the tarp covering the vessel mar Schreiber's message—markings left by several dozen protesters on nearby bridges who, as the barge passed, pelted it with balloons filled with fluorescent green paint. The streaks of paint reflect the opposition of many activists and residents in Washington and Oregon to the disposal plan for the Shippingport reactor. They also make it clear how much times have changed since the reactor was born.

Shippingport's tale is really nothing less than the story of commercial nuclear-power generation. The story began in September 1954, in a much-publicized media event from a Denver television station where President Eisenhower waved a "radioactive wand"—a neutron source—in front of a small detector. This device sent a radio signal that triggered the groundbreaking for the Shippingport Atomic Power Station. These were the heady days of nuclear power. In the year following Shippingport's completion, Lewis Strauss, the second chairman of the Atomic Energy Commission, made his now-famous prediction that nuclear energy would soon be "too cheap to meter."

It is clear now that the Shippingport reactor was more a key component of a public relations campaign than a technical or economic breakthrough. At the time, the Eisenhower Administration was preoccupied with the fact that the Soviet Union had made its own nuclear weapons, and had just brought on-line its first weapons-producing *and* electricity-generating reactor at Obninsk. Shippingport offered a way to offset the Soviet Union's newfound nuclear limelight—making the United States the world leader in the *peaceful* use of the atom.

Ironically, the "civilian" Shippingport reactor was actually a military prototype originally planned as a propulsion system to power a ship in Adm. Hyman Rickover's still-youthful nuclear Navy. The reactor was a scaled-up version of a design the Navy had already used successfully in its submarines, a so-called pressurized water reactor. In this type of reactor design, still the most commonly used throughout the world, the nuclear fuel heats water under high pressure in the reactor vessel. The pressurized water is pumped through pipes that get hot enough to boil coolant water into steam, which in turn is captured to drive turbines that generate electricity.

Shippingport actually began generating commercial electricity for a local utility company by the end of



On-line in its heyday, the Shippingport reactor was supplying power at a cost of more than ten times that generated by coal.

September 1954: President Eisenhower breaks ground with a "nuclear wand."

1957. In truth, though, like the feeble man behind the curtain who was operating the visage of the Wizard of Oz, the Shippingport reactor's record shrank beside its own image. Shippingport was acknowledged early on to be an economic failure, producing electricity more than ten times as expensive as that generated by conventional coal-fired plants of the day. But to early proponents of nuclear energy, it didn't matter. Shippingport was a symbol of a new age. And the utility didn't mind, because Shippingport was a heavily subsidized government project. Part of the arrangement dictated that the government would be responsible for the project from cradle to grave, which explains the Energy Department's involvement today. In decommissioning other large-scale commercial nuclear-power plants in the years ahead, however, the industry will be left on its own.

Shippingport's symbolic mystique continues to overshadow reality even in its demise. The reactor vessel's burial isn't triggered by a "radioactive wand" but it is a media event just the same, a symbol being used to benefit the nuclear industry. Little matter that the Hanford Reservation is already home to six similar reactor vessels removed from decommissioned nuclear submarines and quietly buried by the Navy, or that the government is overseeing the project's every detail, depositing a government-built reactor on a government-built reservation. This, we are told repeatedly, is a prototype of the first commercial disposal effort of its kind, a demonstration that promises many successful efforts from the nuclear power industry in the future.

On Thursday morning at the dock, the task ahead is to haul the mammoth cylinder on its 320-wheel transport trailer to its designated burial site at Hanford. Three huge trucks with names such as "Mary Ann" and "Big Jim" painted above their front fenders spew diesel fumes as they strain to lug the reactor vessel off the barge. But on the twisting gravel grade away from the dock they lose their traction and slip back down. Eventually, two more enormous vehicles must be recruited to aid the cause, underscoring the uncertainties involved in the entire decommissioning process. Finally, the ungainly caravan manages to take the first hill leading away from the dock, but even with all this horsepower, the trucks can only move about three miles per hour, and even that pace seems difficult.

The line of cars following along carrying reporters, amateur photographers and other interested observers makes a very appropriate cortege. If only they all had their headlights turned on, it would seem much like an ordinary funeral procession behind a quite extraordinary hearse. As evening falls, the vessel is parked on a Hanford service road, starkly, incongruously posed against the sunset and just visible from the edge of town.

Meanwhile, in Shippingport, Pennsylvania, 25 miles outside of Pittsburgh, the reactor vessel's former home is quiet. It still looks like a messy construction site, but not much is left here. It will take almost a year to complete the project's mandate of returning the site to the Duquesne Light Company (the Pittsburgh utility

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that ran the Shippingport plant) for unrestricted use. But when it is all over, John Schreiber stresses, "the place will be as safe as my backyard."

There is little sign now at the Shippingport site of the years of demolition work that have taken place, but a clue to the project's magnitude are the fragments of several dense cement foundations marking the muddy earth, six feet thick in places.

With this kind of bulky composition, nuclear power plants would be tough to dismantle even if they were not radioactive. The same massive structure touted for its safety by the nuclear industry during the plant's construction and operation has now returned to haunt the industry in the decommissioning process.

December 1988: the "heart" of the nuclear reactor is lifted from Shippingport's Atomic Power Station.

About 15 percent of all the materials used in the construction of an average reactor will emit a discernible amount of radiation at decommissioning time. While most of these materials will contain only low levels of radioactivity, they make up a hefty volume: some 160,000 cubic feet, or enough to cover a football field 12 feet deep in debris. Significantly, though, these figures do not include the nuclear fuel rods that drive the fission reaction in a power plant. While comparatively small in size, these fuel rods account for the overwhelming majority of radioactivity at a nuclear power plant.

A nuclear reactor's fuel is not normally considered a part of the decommissioning process because it is assumed that the fuel will be removed prior to decommissioning. In fact, no country in the world has yet settled upon exactly what to do with these extremely radioactive spent fuel rods. For the decommissioning of Shippingport, though, the problem of where to store its used fuel was bypassed. The fuel assemblies were moved, temporarily, to a military facility in Idaho.

Lifting a 1,000-ton reactor vessel

Tearing down a nuclear reactor makes for an odd kind of demolition work, combining large and complex tools with some painstaking hand labor. Pat Coughlin, the principal engineer for the Shippingport decommissioning project, becomes animated when he talks about the operation he helped design and oversee to lift the 1,000-ton reactor vessel from its underground housing. For this key step a huge frame of steel girders was built, replete with four huge hydraulic jacks and more than 30 steel cables. The jacks, something like those used at a garage to lift up your car, were strong enough to lift more than 6,000 tons, or the equivalent of several shopping-center parking lots' worth of cars. When the steel frame was complete, the jacks hoisted the reactor vessel 77 feet into the air, moved it half again as far horizontally along a track and lowered it onto the transport trailer. "It worked like a charm," says Coughlin proudly, "but that baby was heavy."

The Energy Department's decision to remove the reactor vessel whole, which avoided cutting apart the radioactive structure, saved $7 million and dramatically lessened worker exposure to radiation, Schreiber stresses. This is true, but critics like Cynthia Pollock Shea, a senior researcher at the Worldwatch Institute, and Michael Pasqualetti, a decommissioning expert at Arizona State University, warn that such a procedure will not be possible for larger reactors. Because of this, they say, the Department of Energy missed an impor-

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Delay for a dump

Pointing out that the Mexican wolf cannot speak for itself, a young man at the lectern stared across the ten feet that separated him from two U.S. Department of Energy officials and howled. Twice. If the DOE people were surprised, their faces did not show it.

This was the second of two days last June during which 200 or so people in Albuquerque, New Mexico, expressed their views in public hearings about the first-planned permanent nuclear-waste dump, a $700 million project already 15 years in the making, called the Waste Isolation Pilot Project, or WIPP. The site of WIPP is a 200-million-year-old inland sea long since evaporated into a salt bed that is 3,000 feet thick and lies 1,000 feet below the surface in southeastern New Mexico, not far from Carlsbad. Nearly all the rest of the public commentary—much of it rather more technical and closely reasoned than the wolf howls—was against the project.

Meanwhile, DOE was garnering a great deal of damaging publicity about leaks of radioactive waste into the environment and other problems at its nationwide string of nuclear weapons plants, and none of this was lost on WIPP's opponents.

What the government is planning to bury here is highly radioactive "nuclear trash" from military sites, everything—except for spent fuel rods—from sludge to rubber boots. A half-mile down, huge rooms are being mined out of the ancient salt. A salt burial was selected as best by the National Academy of Sciences as early as the 1950s, because of salt's tendency to "creep in" and encase the 55-gallon drums in a permanent embrace in a geologically stable formation. But problems plagued the project almost from the outset.

When work began in 1975, drilling uncovered a brine pocket and geological "discontinuities" in the salt, and the site had to be moved. At the current site, pockets of brine have also been found in the salt, but scientists at Sandia National Laboratory determined that they are as old as the inland sea itself, satisfying DOE that water will not seep around much in the salt. Other people, including the Attorney General of Texas, fear seepage into the water that lies above and below the salt bed, specifically the Pecos River.

There are many reasons for concern about seepage. Recently, the underground rooms have developed cracks and, due to surrounding pressure, their walls have been closing in three and a half times faster than expected. DOE's response has been to install roof bolts, in the same way that mines are stabilized, and to begin constructing smaller rooms for the first tests of the facility.

Another source of seepage could be from gas pressure building up in the nuclear waste itself, as organic matter such as rubber and fabrics from contaminated clothes decomposes in the sealed drums. Earlier research suggests that this gas may reach 25 times the pressure needed to create fracturing in the salt tombs after the drums have corroded. DOE now plans to test this by burying small quantities of waste in the new, smaller rooms when ready—although some scientists argue that the tests could be done aboveground as easily, with less risk.

Nicholas Secor

A container for burying high-intensity nuclear waste undergoes trial by fire.

At the Albuquerque hearings, and a few days later in Sante Fe, public concerns about WIPP mirrored those of the scientists. Even the National Academy of Sciences would declare in July that the combined problems of room closure, gas generation and brine require "urgent attention." This was in response to a call from Energy Secretary James Watkins, who asked for a thorough NAS review of the entire project when he visited WIPP in June, announcing that it would not open in September as planned. Watkins' openness and emphasis on safety and the environmental concerns was a surprising whiff of glasnost from the head of DOE, an agency long known for its secrecy.

Even if doubts about the site are ultimately resolved, there is fear about transportation of the nuclear trash to WIPP—fear that a truck will crash, leading to a devastating radioactive leak into the environment. DOE's Jim Tollison calls the fear a "nonissue."

Tollison put the containers for the lethal material through tests designed by the Nuclear Regulatory Commission and carried out by Sandia. The containers, a type called Trupact II, consist of double layers of stainless steel with ceramic foam in between (each holds 14 drums of waste). The tests involved dropping them, loaded with concrete, 30 feet onto concrete pads and 3½ feet onto six-inch steel spikes, and burning them in jet fuel at thousands of degrees. The NRC has reviewed the results and approved the containers. In the unlikely event of a breach, Tollison says, the accident would be treated like any other hazardous waste spill. Opponents find this a bit cavalier: representatives of the American Public Health Association, for instance, point out that emergency squads along the routes have not had proper training. Others complain that the routes themselves have not been clearly specified, nor has the money DOE promised for bypass highways been forthcoming.

In short, WIPP has been a great tangle of controversy that has both sides pulling their hair in frustration. Meanwhile, the other proposed site for high-level wastes (the spent fuel from civilian and military reactors) at Yucca Mountain, Nevada, is tangled in even greater controversy. Its planned opening in 1998 has been postponed until 2003, and no one is betting on that date.

Jake Page
Corrales, New Mexico

Protesters turned out in force for the reactor's trip up the Columbia River. Some tossed balloons filled with fluorescent paint from bridges along the route. Windsurfers had planned a demonstration but were thwarted by one of the river's rare windless days.

tant opportunity with Shippingport to test the remote-control technologies that will be needed to carve up reactor vessels in future efforts, when government resources will not be on tap.

Even at Shippingport, handling the reactor vessel required caution. Dozens of workers in protective suits with radiation detectors began work in 1985, tearing apart the outside emergency cooling-water tanks with picks, shovels and drills. Then, by hand, they scrubbed down the radioactive residue from the walls inside the plant. Later, the job required bulldozers and backhoes, blowtorches and larger plasma torches, explosives and even wrecking balls. During the height of activity in tearing down the main containment building, more than 200 workers attacked various aspects of the project. All this labor generated vast amounts of debris, which workers sorted into piles of radioactive and nonradioactive material. Over the next few years, aside from the barge that would eventually transport Shippingport's reactor vessel, more than a hundred large truckloads of radioactive waste were driven across the country to the dump at Hanford.

The sheer quantity of low-level radioactive debris generated by dismantling a reactor presents the final major dilemma of the decommissioning process. Currently none of the three operating disposal facilities for low-level commercial waste will accept the volume of debris a decommissioned reactor produces. The prospect of creating the numerous repositories needed around the country to bury the remains of existing nuclear power plants is so politically volatile that renewed consideration is being given by industry and environmental groups alike to leaving the reactors standing indefinitely. The simplest plan would entail posting guards around the plants, at least until some other solution is found. A more elaborate version would be a kind of mothballing, or "entombment," encasing the reactors in concrete. These plans, though, are unsettling in that many of the reactors that will eventually be retired are in or near populated areas. Because potentially dangerous levels of radiation will be present for tens, or even hundreds, of thousands of years, the prospect of leaving a nuclear reactor, emitting low levels of radioactivity, to decay and possibly even be forgotten centuries into the future is not a comforting one. These concerns would remain even if the spent fuel rods were stored elsewhere, as DOE experts contemplate.

For Shippingport, decommissioning was possible because of the availability of the Hanford Military Reservation. The choice of Hanford as the site for Shippingport's remains is rife with historical and political irony. In many ways, Hanford and Shippingport are like matched halves of the nuclear age. What Shippingport was to civilian nuclear-power generation, Hanford was to weapons production. The Hanford Reservation was established as a top-secret location during World War II to produce weapons material for the Manhattan Project. It was here on this sagebrush-desert reservation half the size of Rhode Island that the nation's first significant quantities of plutonium were made, including the plutonium used for the

On the home stretch, the load comes to unplanned stop on asphalt to await some more diesel muscle.

bomb dropped on Nagasaki, Japan. After the Army Corps of Engineers selected the remote site in 1943, work began here at a furious pace. Almost overnight a city of 30,000 workers was imported—virtually none of whom had an inkling of what they were working to build. A "company town" sprang up next to Hanford and, in the intervening 40 years, it has become the sprawling tri-city area of Richland, Pasco and Kenniwick.

Given its history, it is understandable that tri-city residents take a lot of pride in the reservation for which so many of them work. Around here just about everybody or their parents or grandparents was involved in the major war effort that the Hanford Reservation initially represented. But driving down Richland's Proton Avenue, or past Pasco's Atomic Foods and nearby Atomic Laundry, it is easy to see why outsiders call the place "nuclear city," and often claim that the area has taken it all too far. The high school football team in Richland confirms the feeling. The Bombers, as they are called, have mushroom clouds emblazoned on their helmets; a mushroom cloud also rises, billboard-size, at the end of their home playing field.

A barren landscape of hidden contamination

It's Friday now, and we are inside the gates of the vast Hanford Reservation, well past the guardhouse at the entrance nearest the town. Bill Klink, my escort, reports that a specially trained police force here is armed with submachine guns and attack helicopters to protect against terrorists, but the place seems fairly quiet nonetheless. The day is hot, and the mood has dimmed a bit. Inside the guarded reservation, the reporters are gone, as are the casual onlookers. But there is still quite a crowd of managers and other personnel on the scene. And there is a good contingent from the site in Pennsylvania. Pat Coughlin came with several other colleagues from Shippingport. They have brought a cooler of soft drinks in the back of their rented car, and they are squinting from a bluff at the vessel being hauled to the western section of the reservation. The bluff is one of only a few elevated vantage points in the entire reservation, and the view is filled with gray-green scrubby flatland—miles and miles of it.

From here, the land displays a barren beauty that belies the truth about the hidden contamination it holds. Just as Shippingport symbolized the public's hopes about nuclear power, Hanford has come to represent the nuclear age's worst environmental nightmare. During its 40-year history, the Hanford Reservation, with its nine plutonium-producing reactors, has released untold millions of curies of radioactivity into the ground, water and air. In just one example, according to information uncovered by local reporters sifting through some 19,000 pages of government documents, more than a half-million curies of radioactive iodine-131 were released into the atmosphere at Hanford between 1944 and 1957. The accident at Three Mile Island, by comparison, released only 15-24 curies.

This spring, Governor Booth Gardner of Washington and officials from the Department of Energy signed a landmark cleanup agreement for Hanford. The agreement is laudable in its intent, but if anything it dramatized for the world the extent of Hanford's environmental woes. The cost of the 30-year cleanup is estimated at a staggering $57 billion, more than four times greater than the Energy Department's entire budget for fiscal year 1989. The enormous cost of the project reflects the amount of waste material involved—

an estimated 30 million cubic feet of nuclear waste and perhaps as much as one hundred times that amount of contaminated soil. From my perch surveying the vast, open scene amid the tailgating workers in the desert sun, the facts and figures seem incomprehensible, otherworldly.

It won't be until the next day that the vessel is finally driven into its trench but, impatient with its pace, Klink and I leave the bluff to drive the last seven miles to the final resting place. Here, adjacent to Shippingport's assigned trench, are row upon row of thousands of black drums of "transuranic" waste, long-lived but slightly less radioactive than high-level waste material. And just a hundred yards away lies Hanford's most notorious site, where hundreds of large underground storage tanks have leaked more than 500,000 gallons of high-level liquid waste into the ground. That the majority of the hundreds of single-shell tanks built between the 1950s and the 1970s have breached is a tragedy of immeasurable proportion. And despite the recent cleanup plan, no one has any idea how to clean this facet of the site's contamination. The entire area surrounding the underground tank farm is dangerous. And the tanks themselves are still filled with corroding, highly radioactive sediment.

Of all the travesties that have recently come to light about the handling of radioactive materials at the Energy Department's facilities around the country, Hanford's underground tanks may be the most egregious. But they have much competition. Serious radiation leaks have been found at every one of the Energy Department's 16 major nuclear-weapons-production facilities, leaks that have forced many of these facilities to shut down permanently. Yet a wooden sign at the edge of the Shippingport trench gives the entire area an unnervingly euphemistic label. It reads: "Burial Garden."

Early the next morning the trucks will pull away from the site and leave the dry, gravelly dust to settle around the reactor vessel, perched upon a steel pedestal at the bottom of the trench. At some future date when more waste has been added, the trench will at last be filled.

There, under the earth, the Shippingport reactor vessel will continue to emit a low, but discernible, level of radiation for 100,000 years. For this reactor vessel from the world's first commercial nuclear power plant, the job is through. For the nuclear industry, as it faces the legacy left by our reliance upon nuclear power, the real work has yet to begin.

The end of the road: the reactor vessel (left) rests in its burial trench, with other low-level radioactive waste. But this is only the beginning of the search for a way to decommission the world's 500 nuclear reactors.

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By Donald Dale Jackson

The bad and the beautiful: gulls remind us of us

A lesser black-backed gull stalks the beach in search of a meal: almost anything it can swallow.

We may love them or hate them, but these ubiquitous birds hang out at the same places we do, too bold and brash to be ignored

Clutching his plastic bag of bread chunks, an 8-year-old boy stationed beside a small pond in a Victoria, British Columbia, park lobs a piece of crust at a duck. The snack is so well aimed that it barely misses the duck's bill, dropping to the water a few inches away. But just as the duck zeroes in on it there is a sudden blustery commotion of white wings and spray, and the bread is gone, seized by a gull double the duck's size.

The boy tries again, scattering a half-dozen crumbs amid a flotilla of mild-mannered ducks. Three gulls appear out of nowhere and snatch up the bread. He keeps at it until the bag is empty, but the bullies in white grab every morsel. For a moment the boy looks as though he might cry. Then, almost under his breath, he says, "I hate sea gulls."

Thus are prejudices born and reputations made: gullophobia strikes again.

Is this fair? Of course not. Weren't the gulls simply being gulls? Certainly. Is it *their* fault that ducks are terminally timid? Bring that kid back here. Gulls have a charisma-deficiency problem. They get rotten press. Everybody badmouths gulls.

Well, maybe not everybody. There was the best-selling *Jonathan Livingston Seagull*, of course. There's a sizable shelf of gull fiction and poetry ("the gulls, the cloud-calligraphers of windy spirals before a storm," wrote Robinson Jeffers). There's the monument in Salt Lake City to the hero gulls who saved the Mormon pioneers by devouring crop-ravaging grasshoppers with gullish gluttony. And there are a hundred movies with gull screaks accompanying seaside scenes.

The problem goes deeper. Gulls trigger reactions in us that soar way beyond the bounds of reason. Something about them provokes excess. We overdo it with gulls—too much sentimental symbolism, too much righteous moralism, too much romance, too much hostility, too much everything.

Listen to naturalist William Leon Dawson, writing in *The Birds of California* in 1923: "Much that is good and all that is evil has gathered itself up into the Western Gull. . . . [It has] an appearance of sturdiness and quality which is not easily dispelled by subsequent knowledge of the black heart within. . . . [It] is cruel of beak and bottomless of maw. . . . be assured that this gull asks only two questions of any other living thing: First, 'Am I hungry?' (Ans., 'Yes.') Second, 'Can I get away with it?' (Ans., 'I'll try.')"

A 1982 magazine article titled "Gulls have a lot of gall" bristled with the same intemperate indignation. "The unmitigated thugs of the bird world," it called them, "Samurai birds that live by the stab of their sharp beaks, the punch of their wings and the dominion they can establish and enforce over their fellow birds." They may have a lot of gall, but they also take a lot of guff. Even the late Nobel laureate Nikolaas

Like so many improvising ballerinas, laughing gulls decorate the sky as they seem to fly out of the sun.

A male uses his wings to balance himself on the back of his female partner as they prepare to copulate.

Tinbergen, the Oxford don whose 30-year-old chronicle of gull behavior is still the best book on the subject, observed that "a gullery is no city of friends. It is indeed a city of thieves and murderers." And rapists and cannibals, he might have added.

Slander sometimes shades into something uglier. When more than 150 herring gulls were found dead at Hempstead Harbor on Long Island's north shore early this year, the birds turned out to have been poisoned with grain laced with a potent pesticide. "There are plenty of people who passionately dislike gulls," wildlife pathologist Ward B. Stone explained. "And you don't get much excitement about it from the law enforcement people." The presumed motive, a conservation officer said, was irritation about gull droppings on cars, boats and rooftop air-conditioning systems.

Scientists who study gulls occasionally tap the same vein of overreaction, especially when their findings are misapplied to human behavior. Biologist George Hunt of the University of California, Irvine, discovered pairs of "lesbian" gulls nesting together on an island off Southern California, the result of a population overloaded with females. After the media carried the story he was bombarded with calls and letters. "Some people said my research was evil, because it refuted the idea that homosexuality does not occur in nature," he recalls. "Gays thanked me for what they took as acceptance. A Congressional aide whose boss was speaking to a gay-rights group called asking for more information. The whole thing was uncomfortably intense."

What is it about gulls that unhinges us so, unleashing our impulse to exaggerate? "People either idealize

Heermann's gulls work out the question of territory on Raza Island, located in the Gulf of California.

them or reflexively dislike them," says William Drury, a longtime gull scientist who teaches at the College of the Atlantic in Bar Harbor, Maine. "But they're no more predatorial than many others. They're just easier to see because of where they are."

Where they are, primarily though not exclusively, is the shore. Most gulls are creatures of fishing docks and jetties, of ferries and islands and beaches and low tide. They're part of the coastal atmosphere. They hang out, in fact, at a lot of the same places we do, which is one reason we get on each other's nerves. Like pigeons and squirrels and starlings and a few other animals, gulls are what scientists call "anthropogenic," which means they share our habitat and some of our appetites. They chomp our garbage, beg from us, stain our cars—and they're ubiquitous.

Maybe the real reason we overreact to gulls is that they remind us of our most ignoble impulses. Like us, they're omnivores who eat anything not ablaze or en-

Once paired, gulls of most species will stay mated for life, finding each other in breeding season.

Two more ring-billed gulls join Ontario population, much to the distress of some humans in the region.

cased in lead. They're opportunists who take what comes. They can be careless and sloppy. They err regularly and sometimes behave outrageously. I know people like that. I'll be honest: I'm one of them.

Though everyone calls them "sea gulls," the 44 gull species make their living in all kinds of habitats in practically every latitude. Most live close to the sea, but one variety nests in a Chilean desert while another breeds 12,000 feet up in the Andes Mountains. Several types spend at least part of the year in the Arctic. In North America they're deployed like franchisers that outnumber the competition within regional territories: herring gulls have the charter for the northern Atlantic coast, ring-bills dominate the Great Lakes, western gulls prevail on the California coast and glaucous-winged gulls hold the franchise for the Pacific Northwest. One species (Bonaparte's gull) insists on nesting in trees and another (the swallow-tailed gull) is the tribe's only nocturnal rover.

The birds that delivered the Mormons from starvation (thus earning designation for the "seagull" as Utah's state bird) were the California gulls, which nest near inland lakes like the Great Salt Lake. The California gull is regarded as fairly relaxed as gulls go; it even has a distinctive stance that has been called the "California slouch"; ring-bills, by contrast, are reputedly high-strung.

Gulls are admirably equipped for all-weather and all-terrain operations. They can fly, swim and walk with equal adeptness; their businesslike strut contrasts sharply with the low-slung waddle of an ambulatory duck. When they stand on ice or snow their feet are warmed by valves that channel warm blood to their extremities. Gull-watchers have noticed that they spend a lot of time staring fixedly at their feet while standing, as though they had just discovered some terrible blemish, but nobody knows the reason.

They drink both fresh and salt water, secreting excess salt through the bill with the help of special salt glands above their eyes. Gulls that survive to adulthood have a 10- to 12-percent annual mortality rate. The normal gull life span is 10-15 years, but many reach 20, and a few live to 40 and even 50. A particularly gritty one-legged gull showed up outside the house of a man in British Columbia every day for 32 years to accept its daily bread; the tough old bird finally died when it was hit by a car.

A gull colony on an offshore island in the spring breeding season is a sensory extravaganza, bedlam with wings. It looks like a scene from an old film showing a tenement neighborhood on a summer afternoon, with

Something about sea gulls hits home

Two hundred miles offshore in the Bering Sea, gulls flock over net about to be hauled aboard a fisherman.

everyone jammed together on the street and sidewalks. Gulls are street people. They fill every visible patch of ground—loafing, squawking, skirmishing, bustling about busily in the staked-out territories that are all the real estate each pair needs. At first glance it appears to be a community of unconnected individuals facing all directions in every imaginable posture, but an onlooker soon realizes that this chaos has an underlying order, not to mention strictly enforced statutes: this is a city for couples only.

A male and female huddle close together and "choke," dipping their heads while rocking forward with chests low, a ritual that is part of selecting a nest site. Two males stand at the frontier where their territories meet and charge each other again and again, without making contact, the interim victor consolidating his gains—an inch or three inches of dirt—with tiny steps after each spurt. A stranger blunders into the wrong neighborhood and is pecked and wing-slapped until he retreats.

For symbols of freedom, pressures abound

A female pecks at a male's bill and the male regurgitates a small fish, which his mate eagerly eats; in gull society this is love. Body language is important—the female flirts by lowering her back in a submissive, crouchlike posture. "Gulls are great symbols of freedom," says research biologist Kees Vermeer, who studies seabirds in Sidney, British Columbia. "But the fact is it's hard to think of a place with more rules, more pressures and more tensions than a gull colony. It's anything but free."

Territorial disputes between male gulls often escalate into bloody beak-and-wing brawls with the stronger bird sometimes standing on his foe's chest and pecking angrily. Peter Pyle, a biologist who studies western gulls on the Farallon Islands off San Francisco for the Point Reyes Bird Observatory, was a reluctant witness to one such battle.

"They grabbed each other's wings and bills and pulled. I've noticed that one usually quits when it gets that fierce, but this time neither one backed off. They'd stop and pant awhile and then start again. I tried to stop it but couldn't. The fight went on for four or five hours, it was like an old-time bare-knuckles bout. The other birds stood around watching. At the end one was so weak he just sort of wobbled and sat. The other flew off weakly. The next day one was gone and the other couldn't fly. The day after that he was gone, too. Presumably, they killed each other."

When gulls pair up it is the females who do the cruising and choosing. The female homes in on a male slightly larger than herself and approaches him in the flattened-out "I'm-yours" position, occasionally tossing

Patient, well-fed gulls check out the day's menu at an open dump in the high Arctic at Tuktoyaktuk.

A proliferation of accessible garbage in this century led to population explosions of these "flying rats."

her head in a way the male finds beguiling. If they establish a bond they usually copulate within a few weeks. I shamelessly watched a pair of California gulls in the act at a colony on San Francisco Bay. The male, chattering rhythmically, climbed on her back and maintained a one-sided conversation for the 60 or 70 seconds it took. The female stood silently on legs that looked toothpick-thin and teetered slightly. When it was over they moved a few feet apart and gazed in opposite directions.

Gulls share parenting chores equally, both the incubation of the eggs—normally three—and the care and feeding of the chicks, which begin flying at anywhere from 3 to 8 weeks. Joanna Burger, a behavioral ecologist at Rutgers University who has studied gulls on five continents, has determined that parents with the most equitable partnerships are the most successful in producing young.

They usually mate for life, though many take separate vacations after the kids flap off on their own in late summer. Vermeer discovered that many glaucous-winged gulls that breed off Vancouver Island stay together through the winter, but most gull tandems split and find each other again, somehow, the next spring. Some species migrate long distances—the little Franklin's gull travels from Minnesota to Peru—while others remain close to home.

The gull divorce rate—breakups are most often due to reproductive failure—is about 3-5 percent a year, commendable in any species. "They have great fidelity, they're good mates and good parents," says John Ryder, a biologist at Lakehead University in Thunder Bay, Ontario. Ryder has found that the ring-billed gulls he studies on an island in Lake Superior will adopt a lost chick—though many adult gulls hunt and cannibalize alien chicks.

But if most gulls are faithful and responsible by their lights, there is also a minority of misfits and incorrigibles in every colony. Peter Pyle became intrigued by a group of females he identified as "spinsters" on Southeast Farallon Island. "They stay on the edge of the group looking shy and skittish," he explains. "If

Donald Dale Jackson's tastes are as omnivorous as his subjects'; recently he has written on baseball, the Johnstown flood, ethnobotany and U.S. Marshals.

Herring gull struggles with success as it maneuvers a fish that seems too large for it to simply swallow.

In Monterey, California, glaucous-winged gull savors the moment before consuming a starfish hors d'oeuvre.

A black hat among birds, this gull absconding with a tern egg confirms the indictment against its kind.

someone moves toward them they jump away. There's a nervous uneasiness and lack of assurance about them." Ryder estimates that, of the 3,000 male gulls in the colony he researches, perhaps 10 are chronic troublemakers who practice what he calls "aggressive neglect." "They ignore their mates and harass and rape other females. You can spot the individuals. It may be their hormone level." The rapists usually attack at a time when the female is incubating and her mate is off hunting.

Nikolaas Tinbergen, the pioneering gull scientist who died last December, suggested in *The Herring Gull's World* that gulls reach conclusions about one another's reliability. He noticed that alarm cries sounded by a colony's most jittery residents were routinely ignored by the others, while calls of more dependable sorts were taken seriously. Tinbergen also observed that some gulls attack others without reason or provocation, apparently because they just don't care for them.

From barbecue to nuts and bolts

Gulls are omnivores: they hunt shellfish on beaches, dropping their finds from a carefully calibrated altitude to break them and get the meat within; they swarm behind plows to nosh rodents and insects, shallow-dive for fish in the surf, dispatch eggs of their own kind and others, cadge snacks and mug ducks at seaside parks, shadow ferries and fishing boats, and assemble in unruly hordes at landfills and dumps. The blockheads among them snatch golf balls in their beaks, and rain nuts and bolts on factory roofs in the forlorn hope that something good might be inside them. They depend mainly on their vision, and eye each other carefully for clues that might lead to meals. Scientists say gulls develop individual tastes: some prefer an all-fish diet, others are partial to insects or garbage; Joanna Burger kept a pet gull that favored barbecued chicken.

Their main shortcoming as compared with other birds is their inability to carry a tune. They sound off instead in a variety of unmelodious, strident calls with specific meanings. Their "long" call, William Drury explains, means either "I'm here and I'm staying here" or "I'm coming and you'd better move." They have a "choking" call, a head-toss call, a "mew" call related to feeding, an appeasement call and several alarm calls, identified by Drury as *ka-ka-ka* (low-intensity annoyance), *klio* (high in the air) and *kao* ("To your battle stations"). The arrival of a predator—a raccoon, dog, hawk, owl—sends the whole outfit into clamorous cry. Mob attacks sometimes ensue: Burger once saw a flock of indignant Franklin's gulls harry a trespassing moose to distraction.

But it is in the air that gulls express themselves most

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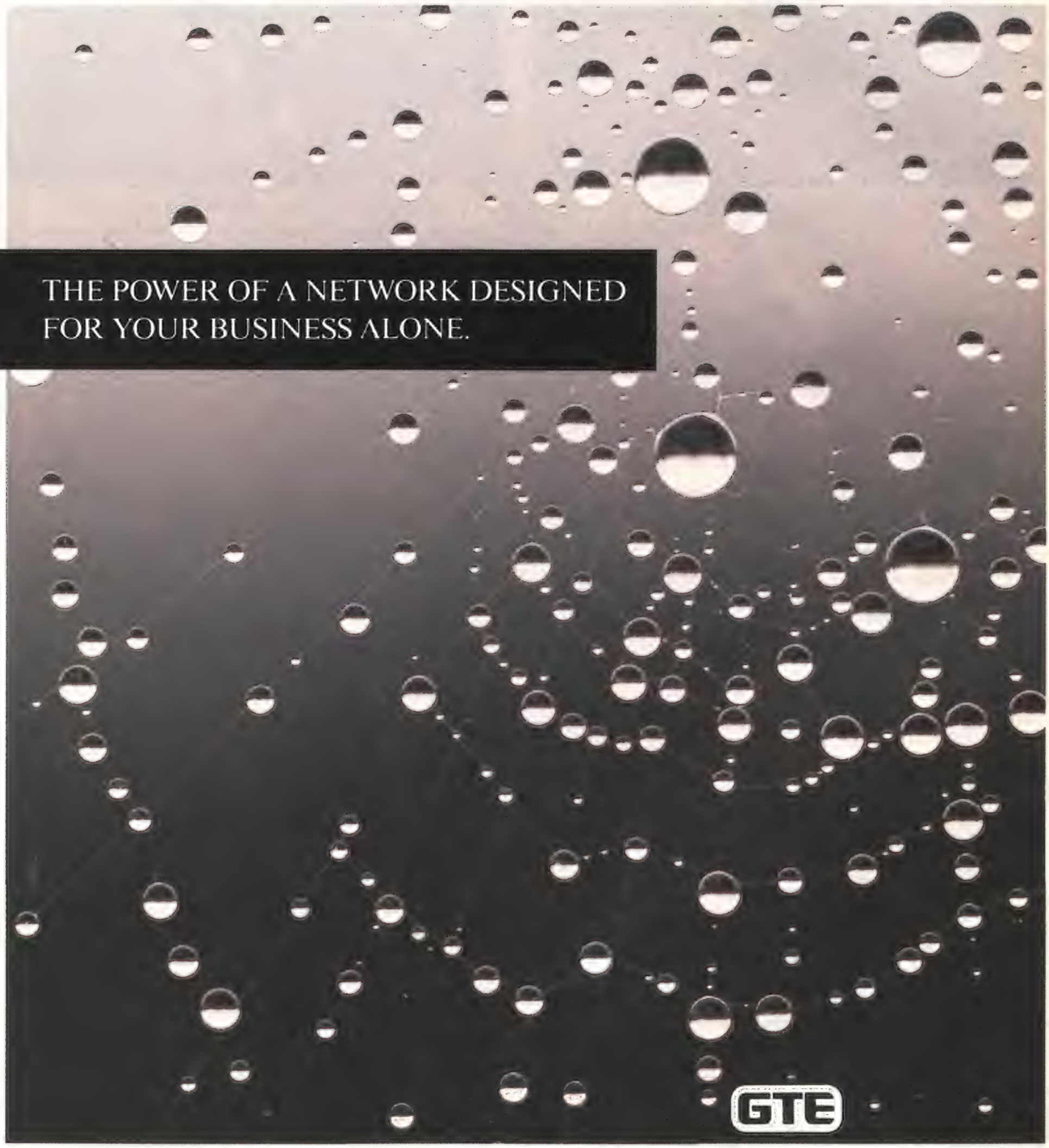

THE POWER IS ON

A greater black-backed devours herring-gull chick, then (at right) is itself attacked by one of the parents.

Such behavior is by no means limited to gull species; crows and night herons do the same around the world.

sublimely. Hanging motionless in an updraft, maneuvering adroitly in the slipstream of a ferry, rhythmically beating their gray-and-white wings with unhurried grace, merging soundlessly with a cloud, they are at once the essence of avian beauty and defiantly themselves. Gulls reject the lockstep discipline of swallows and geese, and opt instead for aerial individuality. Twenty gulls in the middle distance are 20 different punctuation marks—commas, dashes, parentheses, slash marks—no two exactly alike, no two moving at the same speed.

Scientists believe that they play. "You watch them cruise in a high wind, it looks like play," Joanna Burger says. "They do things without apparent purpose," Drury adds. They often look like they're enjoying themselves. One can drop a shell and another will catch it. They seem uneasy in flight only when they blast off in fitful bouts of what Drury calls "silent dread"—a sudden panic without cause. "They go up and mill around and talk about it and then come down someplace else," he says.

Gulls have never been celebrated for their brainpower. Crows take advantage of gulls' lapses to pilfer their dropped shells. Tinbergen was dismayed that they never seemed to realize that a shell doesn't crack when it hits water or sand; he once watched a young gull drop the same shell into shallow water 39 consecutive times. (Contemporary biologists believe that gulls eventually learn to discriminate between hard and soft surfaces.) But what they do know is precisely what they need to know—places, kinds of food, flight paths. In his novel *Argen the Gull* Franklin Russell wrote that his hero knew "where the mussels lived, and how to dive for urchins, the best time to hunt clams, where to puddle for worms, how to break a snail shell [and] how to cheat others out of their food. . . ."

They can find their way back to the breeding colony from wherever they wander. Gull chicks recognize their parents by voice after four or five days, and the parents recognize their neighbors. In a fascinating experiment on the Farallon Islands biologist Larry Spear showed that the gulls he was studying—and irritating—also recognized him as an individual.

Spear was snaring gulls by the feet to reband them. After a while they greeted him with raucous screeches whenever he appeared, sometimes knocking his hat off and bombarding him with droppings. When he donned a Halloween mask they ignored him. He tried various combinations of clothing before concluding that the birds were responding to his facial features. Peter Pyle and other Farallon scientists later encountered the same problem while banding. They solved it by wearing a rubber Nixon mask.

It's difficult to imagine a stretch of ocean beach without the sight and sound of gulls, but a century ago they were all but invisible on the New England coast. Hunters bagged them for their feathers (at 40 cents per adult gull) for the millinery trade. Eggers pillaged their nests. "I knew an old market hunter when I was a boy in Rhode Island," Drury recalls. "He told me that there were three years in the 1870s when he didn't see one gull—and he was a hunter." Gulls were conspicuously absent from a set of 50 photographs taken along the Cape Cod shoreline in 1903.

The 1916 Migratory Bird Treaty between the United States and Canada, which protected gulls and other nongame species, halted the slaughter and sparked an explosion in the gull population that has continued ever since. Herring gulls, down to perhaps 10,000 in the East at the turn of the century, have multiplied by a factor of 15 to 20 in the decades since. Gull numbers have increased for most of the past 75

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years wherever they've been counted, though they've been stable in the Northeast for several years. The gull boom has a lot to do with the rising number—until recently—of landfills. Dumps help young birds survive until their hunting skills mature.

Gulls, being gulls, have been in trouble for one reason or another almost constantly since their parts stopped showing up on women's hats. Their bullying, preemptive personalities undo them. Gulls move in on tern nesting sites and push the smaller birds out. Concern for the terns inspired a federal "control" program (the euphemism for gull killing) in the 1940s and '50s. Gull eggs on islands off New England were sprayed with an oil-formaldehyde solution that suffocated the embryos. But the gulls, predictably, proved tough to control: breeding populations declined for a few years and then bounced back while the terns struggled to hold their own.

Drury, who as a former Massachusetts Audubon Society officer carries impeccable conservation credentials, believes that selective gullicide is the only way to save the terns. "If we don't play God and control them, the gulls will play God and eliminate the terns," he says. The U.S. Fish and Wildlife Service plans to poison gulls on two East Coast islands where endangered roseate terns breed.

Men and gulls clash most directly at airports, where birds operating at nearby landfills have caused accidents and serious damage. Bird-plane collisions, more than half of them involving gulls, cost the U.S. Air Force 11 lives and more than $10 million between 1964 and 1974. The Federal Aviation Administration developed an urgent interest in gulls when Air Force One, with President Dwight D. Eisenhower aboard, lost an engine in a run-in with gulls over Long Island. Drury, who was asked to research the problem in the aftermath of the unreported Presidential scare, recommended that the landfills be removed—"That's the only way to move the gulls out," he contends—but they weren't. A Continental Airlines DC-9 lost its radar system near Baltimore last December when a wayward gull knocked a five-inch hole in its nose.

Among the most wanted on the gull-enemies list is Hans Blokpoel, a biologist with the Canadian Wildlife Service in Ottawa. Blokpoel has charged ring-billed gulls in the Great Lakes region with misdemeanors including pecking farmers' tomatoes, besmirching picnic areas, damaging insulation and drainpipes on roofs, and forcing workers at a nuclear power plant to eat lunch inside. In a 1986 report he even accused them of shoplifting, saying that in one town gulls stole groceries from pickup trucks and entered shops.

Larry Spear sets a snare on gull's nest in the Farallon Islands; mask keeps birds from recognizing his face.

A "socially acceptable" population reduction

Three years ago Blokpoel urged a study to determine the need for and feasibility of a "biologically sound, socially acceptable, internationally co-ordinated program to reduce the Ring-billed Gull population in the Great Lakes area to an acceptable level." Since then, however, the ring-bills, which had been increasing at 11 percent a year, have stabilized their population and complaints have dropped. Farmers and other victims of gull persecution who can demonstrate damage can still obtain permits to scare or kill the offenders. He has been criticized by other gull scientists for what strikes them as flimsy evidence and an overwrought conclusion. "If people call and say they have a problem with gulls," he replies, "they're taxpayers and they're entitled to be listened to, and we look into it."

Up in British Columbia's Strait of Georgia, Kees Vermeer hopped out of the rubber dinghy and onto the rocky, half-mile-long island he knows better than anyone alive. It was a bright morning in late April. "I love being here," the 59-year-old Canadian biologist

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THE ART OF MARTELL. SINCE 1715.

Western gull and a chick share a quiet moment. In most species the parents share incubation, feeding.

said. "I spent four months here watching gulls 12 hours a day 25 years ago. Maybe I'm crazy, but I even like the smell of this place."

We climbed boulders covered with kelp and started up a trail through low shrubs. "This is perfect gull habitat," he said, "elevations, protection and openness." We entered a clearing and got our first glimpse of the inhabitants—2,200 pairs of glaucous-winged gulls, deployed in typical saturation style on every foot of bare surface. A dozen perched on the needleless branches of a fir tree they had bombed until they killed it. The clamor was constant but moderate; we seemed to be a bother but not a threat.

"Isn't this wonderful?" Vermeer exclaimed. "It reminds me of the excitement I felt when I first saw a gull colony. Oh, it's such a striking bird, so beautiful and graceful. I was overwhelmed, overstimulated that first time, it swept me off my feet. You could see so much; their life is out in the open. I wanted to know everything about them. I read Tinbergen and learned how they pull grass to displace aggression. Did you know that? I got to know them as individuals and even gave them names, you know, like 'Mrs. Bradshaw.' After a while I could recognize them by their individual behaviors.

"Tinbergen said they were murderers and thieves," he continued, frowning, "but I never thought that. Sure they're opportunists, but I never saw one just walk over and take another's egg. I saw them fight when they were disturbed, of course . . ." On cue, two males charged each other ten feet from where we stood. The biologist seemed torn, reluctant to acknowledge their less-attractive habits because of his affection for them. "I've heard the arguments for control," he said, "but personally I couldn't do it. I just couldn't do that. I think before we do, we ought to incinerate all our trash and get rid of the landfills. The problem is people, not gulls."

The gullopolis throbbed with life: gull treaties were being negotiated here, gull justice dispensed, gull promises exchanged, gull deals closed. I could see a thousand birds. Most of them were looking at us, in their sidelong, avian way. I was struck by the joy that Vermeer so obviously felt to be in this alien and thrilling place again. "I love to talk about gulls," he said, "but there aren't enough people who want to hear about them." He smiled and let his eyes sweep around the vibrant, clangorous scene.

"Sometimes I think I'm part gull, you know. I let off steam by pulling weeds."

Just a chick and yet somehow projecting strength, this western gull seems unfazed by strange new world.

No matter what they look like outside, busin

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By Joe Sherman

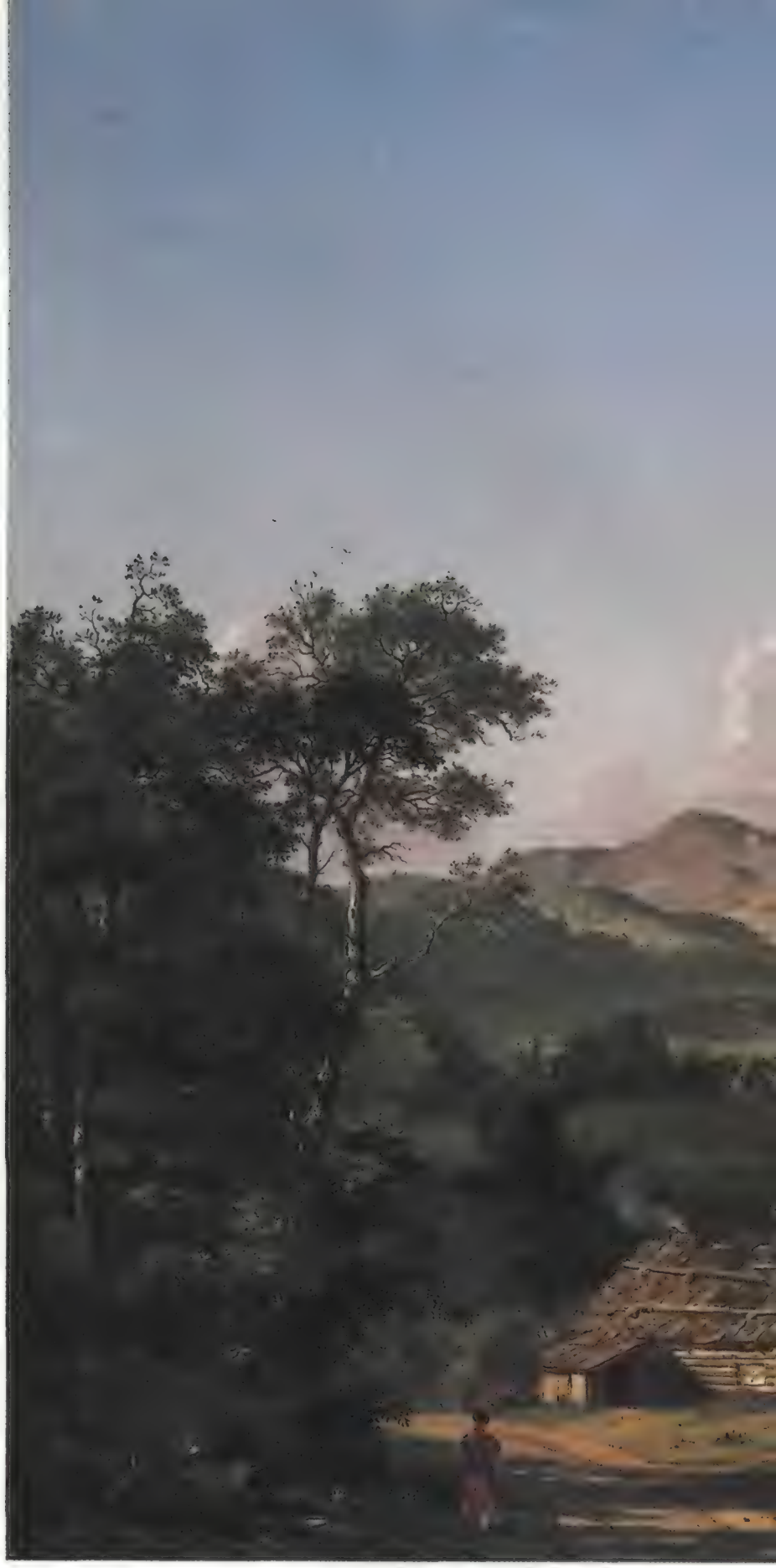
In the halcyon days when pictures of the land came first

A pop star long before the term was known, Frederic Church embodied a mid-19th-century interest in both the exotic and the scientific

A shy New Englander who occasionally hid behind the curtains to see how the young ladies were responding to his paintings, Frederic Edwin Church was one of America's first great culture heroes. In the 1850s and early '60s Church had the era's equivalent of visual hit singles: *Twilight in the Wilderness, The Heart of the Andes, The Icebergs.* Top-hatted gentlemen and parasol-shaded ladies, eager to be part of the New York art scene, stepped from their carriages, stood in line and paid two bits to see a single canvas. Each major painting was sent on American and European tours, more show biz than today's art biz. Several of them ended up at Charles Day and Son, "Lithographers to the Queen," in London. Subsequent sales of the prints on both sides of the Atlantic meant a long life for Church's images in an age hungry for them. In the years just prior to the advent of popular photography, such landscape paintings introduced the public to nature at its most spectacular.

In his early 30s, the tall, thin, religious artist was pursued by reporters, applauded at the opera and compared to Britain's master of the sublime in painting, Joseph Turner. During the mid-19th century, when landscape painting was the major American art form, Church caught the wave of his time and rode it perfectly. But it all ended rather quickly. Like a middle-aged rock star out of tune with changing times, he lost his audience.

You could blame Darwin. *The Origin of Species,* published in 1859, claimed that Man had not been unveiled fully formed, several thousand years before, complete with animals and oaks, by a "Divine Architect" who manifested Himself in the mountains, the forests and the light. You could blame the Civil War. Its carnage made the Romantic preoccupations of the previous era seem almost an escapist diversion. You could blame the Industrial Revolution. More than anything, it changed America's view of nature from something idyllic and mysterious into a commodity to be exploited.



Human reference, as in home of *Home by the Lake,* is diminished by the magnificence of the land.

National Gallery of Art

Major emphasis is on the sweep of sky and land in New England pastoral, sold this year for $8.25 million.

Church was practically forgotten by the time of his death in 1900. A painting like *The Icebergs*, writes art historian James Thomas Flexner, "would probably have been . . . completely unsalable (it was so unfashionable and big) except as a wall covering for a restaurant or cheap movie theater."

A brief auction at Sotheby's in 1979 changed that. *The Icebergs*, which had been rediscovered in a mansion in England, sold for $2.5 million; at the time, it was the largest sum ever paid for a painting by an American. David C. Huntington, Church's biographer, wrote: "A readied few who had been observing the revival of regard for our landscape painters of the 1850s and 1860s paused to savor the moment that signaled a great artist's recovery of glory."

The Church revival has continued. Earlier this year, *Home by the Lake* (above), a New England pastoral painted in 1852, sold for $8.25 million. On October 8, a show focusing on Church's years as a public figure opens at the National Gallery of Art in Washington,

D.C. The exhibit, which runs until January 28, 1990, features 49 of his major paintings.

The journey that separated Church from his contemporaries began in 1853, when he headed for South America. He wasn't interested in the standard European jaunt to see Old Masters. He wanted to see the exotic, the spectacular. The great German naturalist Baron Alexander von Humboldt, whose monumental work *Cosmos* had captured Church's imagination, had said that South America was the place to see the God-rich wilderness of the natural world at its most awesome.

Church traveled up the Río Magdalena in Colombia, trekked over the mountains to Bogotá and then headed south. Guides led him down the Avenue of the Volcanoes toward the city of Quito. Writing to his mother, the 27-year-old Church described sleeping in houses "completely overrun with huge insects . . . of extraordinary size," crossing rope and rawhide bridges, and wearing ponchos and large straw hats.

Back in New York, Church exploded in a burst of creativity that lasted for two years. As was soon to become his habit, he didn't paint major works of his recent trip immediately. His chief works remained New England landscapes, albeit with tropical skies based on sketches from his travels. He was savoring and distilling his Ecuadoran experiences.

In 1855 Church was ready. He unveiled *The Andes of Ecuador.* Cotopaxi blew forth steam on the right, to the left stood a snowcapped mountain peak, and in the foreground, which the viewer seemed to be entering, was a panorama of a rain forest, a savannah and exotic llamas, all framed by vegetation and a tropical light that very few Americans had ever seen. It was a cosmic vision, an epic painting that broke formulas. Church was through with civilization and nature in harmony, and on his way to landscapes where wilderness and light overwhelmed all.

Time spent with a troubled titan

When a young Church arrived on Thomas Cole's doorstep in the bustling town of Catskill, New York, in 1844, he was a privileged 18-year-old whose father, Hartford businessman Joseph Church, was indulging his son's inclination toward art. Thomas Cole, 43, was a troubled titan (SMITHSONIAN, September 1975). An English immigrant who had founded the Hudson River School, Cole was at that time wrestling with his artistic direction. With the impressionable Church a virtual sponge for his vacillations, Cole switched from realistic American scenes, which he labeled "lower style" landscapes, to symbol-laden allegories, or "higher style" landscapes.

Cole and his student went on sketching rambles up into the Catskills. They crossed the Hudson by ferry and, from the steep bluff where Church would one day build his country estate, Olana, drew their impressions of the thickly forested, largely uninhabited countryside to the south.

Church returned to Hartford after two years with Cole and soon moved to New York. It was a fine time to be a young artist in the great city. A new breed of patron had made his appearance. Prosperous and patriotic, he wanted American paintings that moved him and that he could relate to. At the same time, New World scientific advances were inspiring the country, and the writings of the Transcendentalists, led by Thoreau and Emerson, were glorifying the mysterious, the luminous, the spiritual in nature. Writers and artists were revered and respected. The painters did better financially, though, for their works, which were often charged with the potential of Manifest Destiny, sold so well that even a mediocre landscapist could earn a good income. Patrons came in large numbers to the city's National Academy of Design shows, where the newest art was hung, and to even bigger exhibitions at the American Art Union.

From 1848 until 1853, Church lived the typical land-

Olana State Historical Site

Frederic Church was 44 when Dresden artist Ludwig Sturm painted this portrait from a photograph.

George Walter Vincent Smith Art Museum, Springfield, Massachusetts

Church's early masterpiece, *New England Scenery,* was accomplished when he was 25. More Arcadian than naturalistic, it caught the imagination of the public with its agrarian vision of a nation in the making.

scape painter's life. During the summer months he was a tanned traveler with a brush, rambling through the Catskills of New York, the White and Green mountains of New Hampshire and Vermont, and along the coast of Maine, all settled but relatively unknown places. By the 1850s he had become a painter to watch, one who critics claimed had a "true feeling for art," and who was heading toward an "original path."

Seeking that path, Church hung his final historical landscape, *The Deluge,* yet another homage to Cole. It was critically denounced. But his youthful masterpiece from the same period, *New England Scenery,* seemed to be what the public wanted: synthesized images from the Northeast that had formed his life and travels. "A pristine Yankee Arcadia," the sense of a nation on the move, carrying New England civilization to the interior of the continent, is how Huntington describes this archetypal New England scene, a place where no one had ever been but that everyone could immediately recognize.

Science during this stage of his work began captivating Church. Like high tech today, science was then the new kid on the block. For Church, science held out the promise of uniting his faith, his art and his love of precise detail. He read voraciously about the new: electricity, biology, geography. His attention to the scientific details of nature refined his craftsmanship until he began to achieve a kind of photorealism in miniature. He also veered away from the main branch of the Hudson River School, which was championing unadorned wilderness as a benign harbor for civilized Man. Church leapfrogged this hands-off naturalist view and sought the grand and the scientific. He sought an art both sensational and intellectual, an art of delight illuminated by a gown of light tossed down by God.

In the mid-1850s, Church's interest in peaceful, pastoral landscapes waned. Like Thoreau, who wrote, "For one that comes with a pencil to sketch or sing, a thousand come with an axe or rifle," Church began to see that the rugged spirituality of the wilderness was

Vermonter Joe Sherman is writing a book on the state's transition from pastoral to diversified; it is due out for Vermont's bicentennial in 1991.

Text continues on page 96

Metropolitan Museum of Art

Sweepingly grand, as well as religious in its concept, *The Heart of the Andes* was preached about in pulpits.

A smash hit, it was displayed in a palm-filled room,
lit by gas jets and tastefully draped in black crepe.

Cotopaxi shows the Ecuadoran volcano called "dreadful" by naturalist Alexander von Humboldt.

Church went out to show why, and in one report
he was called the "artistic Humboldt of the new world."

Corcoran Gallery of Art

Niagara was first of Church's many "Great Pictures," exhibited solo to ticket holders only. Such works were performances that went on publicized tours. Viewers frequently used opera glasses to discern tiny figures.

becoming expendable, particularly in the Northeast that he knew so well. In his American landscapes, like *Sunset*, he painted wild, hard-to-get-to places seemingly beyond the progress of Man. Huntington argues that at this time Church was in pursuit of the metaphorical or symbolic as surely as Herman Melville had been with the publication of *Moby Dick* in 1851. The big difference was that "the writer sought to tell his fellow-men that their powers were finite," Huntington says. "The painter sought to tell his fellow-men that their powers were infinite. It is the difference between profound Irony and profound Hope."

Ironically, the painting that catapulted Church into the status of a superstar with a top hat was not of a remote, magnificent place, but of an accessible, recognizable one. *Niagara* (above) was hung in 1857. Critics immediately piled up adjectives as high as the falls: "sublime," "truthful," "religious," "wondrous."

With *Niagara*, Church became a painter of the so-called Great Picture. A Great Picture was a large canvas hung solo, with a fee paid at the door. The booming art market surrounded a Great Picture with elements that flourish today: advance hype by the press, celebrities at the opening, large sums of money, international attention, a percentage of the gate, a long and much ballyhooed tour, and focus on the artist himself as well as on the work. Never mind that the shy Church had reservations about being what Church scholar Gerald Carr calls "a virtual matinee idol of art"; the growing art market had a need for heroes and Church fit the bill.

Niagara also separated Church for the first time from the democratic group showings at the National Academy of Design. The painting was installed in the gallery of Williams, Stevens and Williams, art speculators who had paid $4,500—an enormous sum then—for the picture and the copyright to sell prints. The first individual to purchase a print was former President Millard Fillmore.

Church seems to have been impetuous and good-natured. Yet even in the company of his fellow artists he was somewhat remote. At the core of his personality there had already formed an artistic detachment, something he probably came by naturally, thanks to his Puritan upbringing, but which Cole had also encouraged as a means of protection from a fickle world.

Certainly some of Church's contemporaries resented his success. Critics would soon begin skewering what the public loved: the painter with the cameralike eye. Always a bit removed (his journals tend toward impersonal description, as though he kept his emotions private even from himself), Church the culture hero seemed as scientifically precise, as cool and objective, as the chilly-looking water tumbling over the falls in *Niagara*. It was this very coolness, in fact, that captured the era's essence: its infatuation with the hard-edged remove of science, its love of visual detail before the age of popular photography. Church's detachment, which would eventually strap his artistic growth, leaving him behind as other painters explored their hearts instead of wild terrain, allowed him to be possessed by an adoring public while remaining impossibly distant, like a god or one of his Great Pictures. In the 1850s, when the theater and music were the popular entertainments, it was these Great Pictures that helped elevate the visual arts to a new status.

In late 1857 the artist was again near Quito, staying in the same house his mentor Alexander von Humboldt

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had occupied 55 years before. He trekked to Sangay, an active volcano. "I knew I could get no view of [Sangay] that night without a scramble," he wrote in his journal. So he scrambled. "Lo! Sangay, with its imposing plume of smoke stood clear before me. I was startled." He drew, "but constant changes rapidly followed and new beauties were revealed. . . ." He vividly described roiling clouds, dazzling columns of vapor and steady explosions of black smoke, "the whole gigantic mass gradually settling down over the observer in a way that was appalling."

The Heart of the Andes appeared two years later (pp. 92-93). Five and a half by ten feet, lit by gas jets, surrounded by black crepe curtains and shown in a room filled with palms, it drew such a crowd to the new Studio Building on Tenth Street that police had to clear the area out front. For those who got in, written guides, one of which was 43 pages long, helped you "take a trip" through the work.

If you had forgotten your opera glasses, you were supplied with a long thin tube so you could look at the exotic landscape a little bit at a time. You practically read the surface of the brooding work like a book. One visitor to the New York exhibition was 24-year-old Samuel L. Clemens, who checked it out three times with his opera glasses. It left his "brain gasping and straining with futile efforts to take all the wonder in," he wrote.

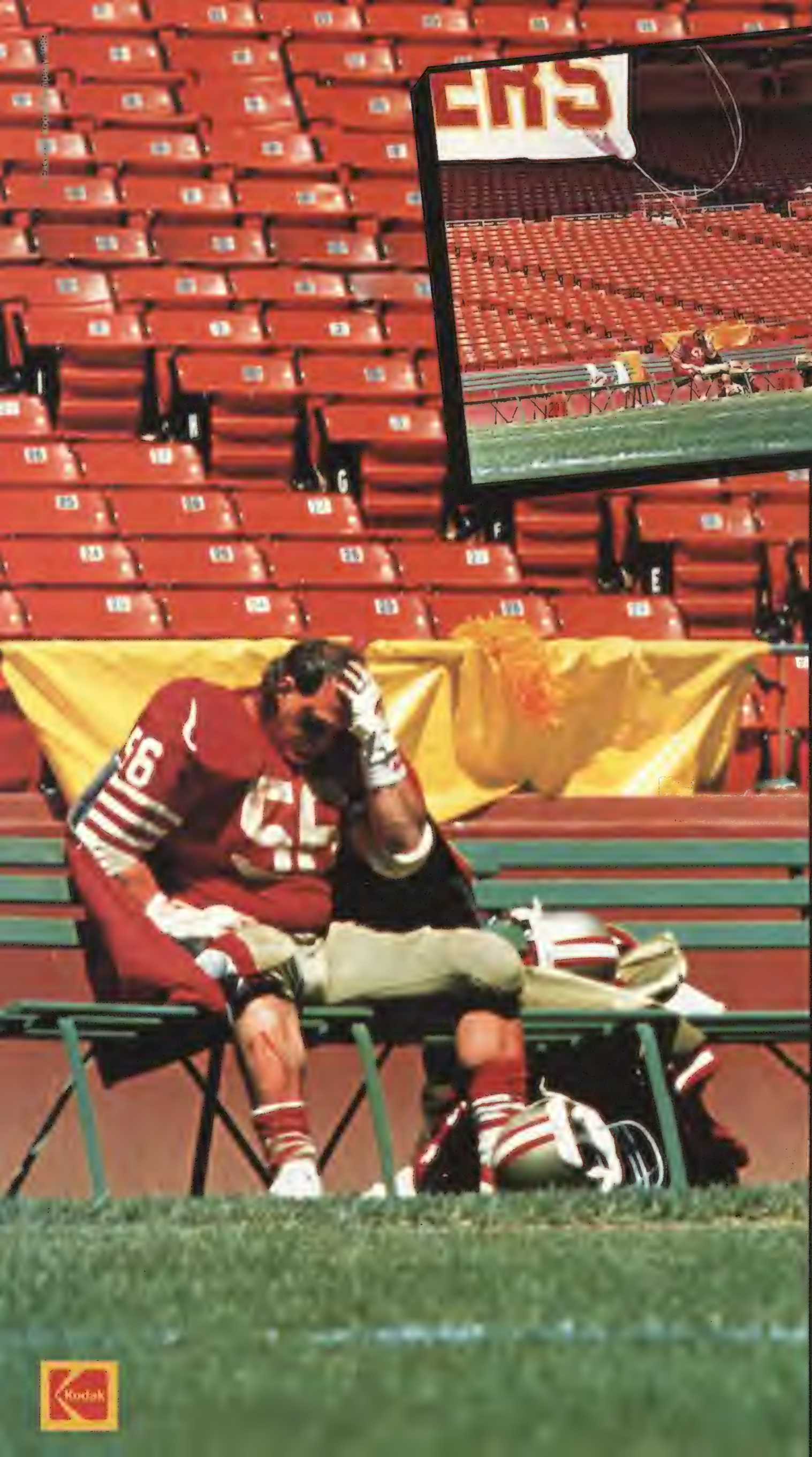
The Heart of the Andes became the most celebrated American painting of the century and sold for $10,000 to a New York manufacturer, equaling the highest price paid for an American painting prior to 1865. It also drew a diminutive, porcelain-skinned young woman named Isabel Carnes into the Studio Building. Whether Church was behind the curtain at the time or not, we don't know. But he met Isabel and fell in love.

Church's power stood at its peak. He was famous in America. Queen Victoria and Prince Albert would soon enjoy a private showing of *The Heart of the Andes* in London. *Niagara,* back from its foreign tour, drew fresh crowds. But the Civil War rumbled in the distance and Church's beloved science gave him the back of its hand when *The Origin of Species* appeared, yanking the Divine Architect out of the whole picture. The Romantic era was approaching a precipice over which it would tumble, never to recover.

Meanwhile, perhaps pressed by his own notion of what was topical and by a sense of contrast, Church set off to paint icebergs, which were firing the popular imagination as a result of macabre and patriotic hunts

Metropolitan Museum of Art

In later life Church traveled to the Middle East and Europe, bringing back sketches for future paintings, like this dramatic rendering of the Parthenon (1871), which in the artist's view was architecture at its perfection.



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Quiet corner of the east parlor at Olana, the grandiose home that Church designed, shows his eclectic taste.

for the fabled Northwest Passage. Like Jules Verne with a brush, he headed for the ice-infested waters of the North Atlantic on a schooner named *Integrity*. Church sketched while Louis Noble took notes. Noble, who was Thomas Cole's biographer, went along to write a documentary book, *After Icebergs with a Painter*, which would be released at the same time as the painting.

In this strange and icy world, despite bouts of seasickness, the usually cool artist found time to be warm and playful. Once he rowed alongside an "ugly berg" and tossed a flaming barrel and bright flares at it in order to enjoy the dance of illumination created on the ice. Another time, gathering ice cakes at the request of the captain, Church clambered onto a "little mouse of a berg," slipped and almost fell in. He made it back into the rowboat but, because of choppy water, he and Noble had their hands full keeping the little craft from capsizing.

Once Church was back in New York, pressure grew for him to begin a Great Picture from the land of the northern lights. Also growing was the artist's annoyance at celebrity, at loss of privacy. In 1860 he married Isabel and moved up the Hudson to a farm he had bought across the river from the village of Catskill. Life was hectic and getting complicated. The artist worked on his Turner-like *Cotopaxi* (pp. 94-95), completed *Twilight in the Wilderness*, had trouble starting *The Icebergs*, began a family and looked after his farm. A year later, in April, *The Icebergs* opened at a gallery on Broadway to critical acclaim, but any additional fanfare it may have enjoyed was largely overshadowed by the news of the firing on Fort Sumter just 12 days before.

During the war years Church painted a few works, helped raise funds for the Union, worried about his mortgage (his father helped him out), and drifted further away from the new political and industrial themes of the times. With Isabel in Cozy Cottage, Church seemed almost to have stepped backward into one of Cole's pastorals of the 1840s.

Personal tragedy struck in 1865. Both of the Churches' young children died of diphtheria. To recover from the loss, Church and his wife journeyed to Jamaica, from which came *Rainy Season in the Tropics*, a work Huntington labels the "ne plus ultra of hope." Yet Church's paintings did not clog streets with admirers now. Albert Bierstadt's Rocky Mountain scenes got better press. And artists like George Inness, who was Church's age but who had matured slowly, were moving toward a more personal, lyrical style.

Church clung to his faith, his painting and his out-of-fashion ideals. He bought the summit above his farm and had architect Richard Morris Hunt draw plans for a French chateau. Then, in late 1867, he put everything on hold and sailed for Europe and the Holy Land with Isabel and a new infant son. He needed to explore and paint the "sacred geography" that Jesus had trod. He also wanted to see and study the architecture.

On the dusty road to Petra

Church was soon a member of a dusty caravan guided by a dragoman who made sure the china was clean and the tents put up taut. The destination was the ancient city of Petra (in today's Jordan), 100 miles southeast of Jerusalem. Isabel, waiting dutifully in Beirut where the jackals howled from the hillsides at night, prayed often, and noted that "God willing, my husband will soon be here." Later, the family visited Jerusalem and Church continued his explorations of biblical sites.

Following trips to Syria and Greece, and an extended stay in Europe, Church returned to the Hudson. Subsequent paintings included *Jerusalem from the Mount of Olives*, *The Parthenon* (p. 98), and *El Khasné*, an illuminated look at the rock-cut monument facing the ancient entrance to Petra. The real fruits of the journey to the Holy Land, however, proved architectural. Church decided that he wanted a

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Persian-inspired villa overlooking the Hudson, not a French chateau. He let Richard Morris Hunt go and hired Calvert Vaux, an architect known for his fondness for the exotic and his willingness to collaborate.

Olana took six years to complete. Church gradually assumed esthetic control (Vaux started calling himself a "consultant") and immersed himself in the project. He drew and redrew everything, from elevations to balusters to slate patterns on the roof. He mixed all the colors. He transformed himself from a painter who worked in two dimensions to an architect and landscape designer who worked in three. He was intent on creating a microcosm of his ideals, a veritable "Yankee gentleman's Noah's Ark," as Huntington calls it, resplendent with his vision of what might have been. Seven and a half miles of roads undulated across meadows, zigzagged through forests, swerved along a pond that was dug to replicate the shape of the Hudson as seen from the top of the bluff where the house was going up. Four years went into ornamentation and the unifying of the design and colors. Finished in 1876, the house was not huge, but nothing like it existed anywhere. Five stories high, with real Japanese teapots for finials on the four corners of the central tower, Olana was a glittering, Persian-tinted diamond overlooking a landscape rearranged and framed by Frederic Church. A culture hero adrift in the new dawn of the Industrial Age, a dawn of brilliant skies colored by smokestacks, Church let all his Puritan reserve go and created a magic-carpet ride for the eye. Inside Olana he gathered a sampling of the world's cultural artifacts, ranging from Chinese silk panels to pre-Columbian sculpture, and from Persian armor to two stuffed quetzals clinging to tropical branches. He hung his own paintings and put copies of Old Masters in the high-ceilinged dining room. He filled the rooms with furniture from Europe, India, China and the United States, with styles like gothic, rococo and Colonial revivals. The house had a central court hall, a Persian concept, complete with a small stage for plays and tableaus. A masterful color scheme linked the rooms together. In the sitting room, nonsensical Arabic script designed by Church accented the trim, and *El Khasné* hung on one wall. An *ombra*, or Persian sun room, faced south so that green plants could thrive all winter.

David Huntington was the first art historian to recognize Olana as an archetype of the Romantic era; it is, he says, as significant of its time as Monticello is of the Jeffersonian agrarian period that preceded it. Olana certainly reversed Church's artistic slide, even if the throngs didn't get to pay two bits to see it.

Eventually, Church would carry little weight with the younger generation of artists, many of whom felt like outcasts from a country hooked on Victorian materialism. By then rheumatism had robbed him of his brush hand. He built a studio wing onto Olana, but his painting career was over.

Isabel, frail and practically blind the last years of her life, died in 1899. Church, severely crippled, died the next year.

When David Huntington first went to Olana in 1953 to research his dissertation, he admits to having been "sort of overwhelmed by the place." Sally Good Church, the artist's daughter-in-law, a woman who believed in the forgotten artist's genius, had miraculously maintained Olana as it had been at the time of his death. Yet her mind was not very clear. "She thought I was an opera singer from Hartford," Huntington recalls.

Sally Church cooperated with his research, and Huntington, feeling the tug of destiny, immersed himself in what proved to be a treasure trove of the life and times of Frederic Church. But when Sally Church died in the early 1960s, Olana barely escaped the auction block. Huntington worked desperately to save the house. He and a group of others proved instrumental in getting the State of New York to buy the place as a state historical site. "The auction tags were on the pieces of furniture," says Jim Ryan, the site manager and director today.

Olana exemplifies Church's vision as clearly as his paintings, sitting as it does on a bluff across from where Thomas Cole had warned his eager student: "An artist should be in the world, but not of it: its cares, its duties he must share with his contemporaries, but he must keep an eye steadfastly fixed on his polar star, and steer by it whatever wind may blow."

The southwest facade of Olana rises in rich, exotic splendor from a bluff overlooking the Hudson River.

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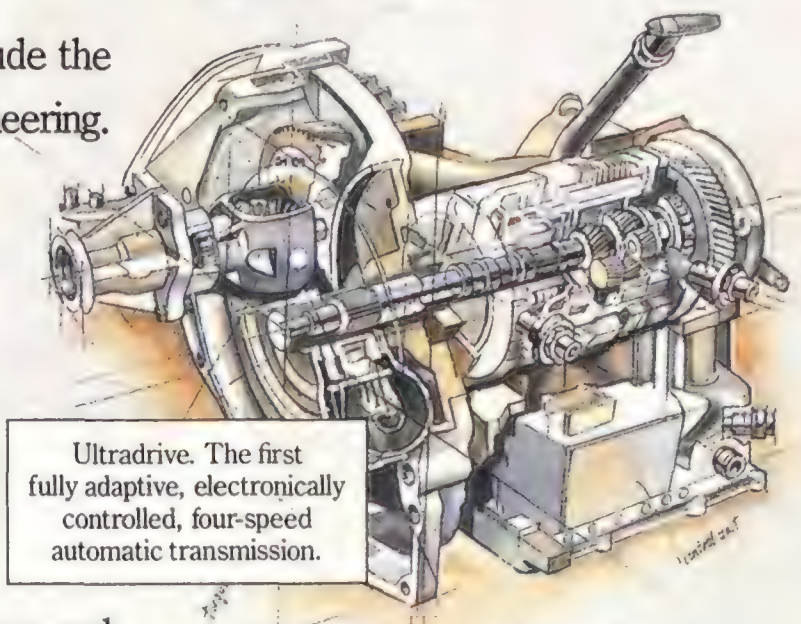

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By Jake Page and Carl Hoffman

On Everest or in the office, it's the tool to have

An ingenious arrangement of springs makes the Swiss Army Knife the world's most portable tool kit; millions won't leave home without it

In full array, it looks like a huge, dreamland insect. It is so well thought out that the Museum of Modern Art in New York has one in its permanent Design Collection. It is carried routinely by astronauts, Everest conquerors and polar explorers. In 1960, the Russians gleefully displayed one among other "CIA equipment" found in Gary Powers' downed U-2.

More, perhaps, than sheltered bank accounts and fine wristwatches, chocolates and cuckoo clocks, it says "Switzerland." It, of course, is the Swiss Army Knife, the most various and famous of jackknives, epitomized in top-of-the-line models with 19 tools and up to 32 separate functions, all packed into a body less than four inches long.

Separately such a collection of tools weighs several pounds: corkscrew, can opener, bottle opener, two slotted screwdrivers, wire stripper, leather punch, scissors, Phillips screwdriver, magnifying glass, wood saw, fish scaler, hook disgorger, ruler, nail file and nail cleaner, metal file, pliers, wrench, compass, key ring, tweezers, toothpick and pen. Throw in a good, stainless-steel jackknife with two blades and you'd need a chest to carry it all. But such a complete tool kit, encased in two strips of red plastic and inlaid with the white cross of Switzerland, weighs eight ounces or less.

Not-so-simple soldier's tools marching out of the Alps, Swiss Army Knives bid to take over the world.

The Russians offered a left-handed compliment when they described one as a U-2 pilot's "CIA equipment."

Testimonials to the knife's performance in extraordinary situations are legion. "I've used a Swiss Army Knife nonstop since I was 16," says Sir Ranulph Fiennes, whom the *Guinness Book of World Records* once called "the world's greatest living explorer." Among other exploits, he is the only man to have ever traveled overland to both the North and South poles (SMITHSONIAN, December 1982). In 1968, Fiennes remembers, "I was in Oman laying an ambush for some terrorists when the magazine on my automatic assault rifle jammed. It was empty and I couldn't get it off." Fiennes pried off the magazine with his Swiss Army Knife. "The only reason I could use it was because it had a particular shape of tin opener on it," he says. (Fiennes is lucky that he didn't need to use the other part of his lifesaving can opener—a slotted screwdriver —at that crucial moment. "As they come from the factory, these accessories are next to useless," warns the

Illustrations by John Huehnergarth

One adventurer said the can opener on his knife saved the day during an encounter with terrorists in Oman.

ever-watchful magazine *Mother Earth News*, "because their rounded corners cause the screwdriver to ride up and out of screw slots, or ruin the screws, or both.")

During a British expedition up Mount Everest's southwest face in 1975, Doug Scott used a Swiss Army Knife to free the ice-clogged oxygen system of his fellow climber Dougal Haston, thus enabling him to make the summit. The British North Pole Expedition of 1978 used the knife to deice their sled runners, and "when one member of the ice group fell through the ice, to cut his clothes off him." When Eugen Knosp, a West German businessman, crashed his small airplane, he cut himself out of the burning wreckage. "I owe my life to a Swiss Army Knife," he later testified. As does the Smithsonian's Olav Oftedal, a nutrition specialist at the National Zoo. A few years ago, he was starting a study of hooded seal lactation on the crumbling Canadian ice pack when a helicopter flying him and his team off the coast of Newfoundland had to make an emergency landing, stranding the scientists on a lonely rock in the sea. They confronted a blustery night and temperatures of 30 below. There was a handful of small, windblasted trees on this rocky little island and, with the saw on his Swiss Army Knife, the only available tool, Oftedal managed to cut some branches and get a fire going. Huddled around it, the team lasted until morning and a timely rescue.

The makers of this miniature tool kit estimate that there are 150 million people around the world prepared to meet such exigencies. According to Xaver Ehrler, export manager of Victorinox, one of two privately held firms exclusively licensed to produce this miraculous object, the Swiss Army Knife owes much of its popularity to American G.I.'s who "discovered" it during and after World War II, and brought it home to what would soon become the knife's largest market.

But production had been going on for a half-century by then. In 1884 Karl Elsener, a German-speaking Swiss, began making razors and surgical instruments in his hometown of Ibach. He hadn't been at it long when he discovered that the official knives supplied to Swiss Army recruits were made in Germany. In 1891 Elsener formed the Association of Swiss Master Cutlers to accomplish what no single cutler had been able to do: develop a pocketknife made in Switzerland for the Swiss Army. Later that same year Elsener delivered a wooden-handled pocketknife containing a blade, a screwdriver, a can opener and a punch: the Soldier's knife.

Soon Elsener was designing models with slight variations that he designated, not by numbers, but by name: the Schoolboy knife, the Cadet knife and the Farmer's knife. Still, the history of this pocketknife might have remained unimpressive and obscure if Elsener hadn't gone one step further. "He wanted to make a lighter, more elegant knife for officers," says his grandson and current president of Victorinox, Carl Elsener III.

In 1897 he made a critical breakthrough: he figured out how to place blades on the back of a knife that would operate from the same springs as the blades on the front, thus making it possible to add more utensils without increasing the size of the handle. He replaced the original wooden handle of the Soldier's knife with red fiber, and added a small blade and a corkscrew, creating the first knife with six blades operating from two springs. The Officer's knife was patented on June 12, 1897. If you were to stumble upon one of

A downed helicopter, a night on a rock in frigid waters—but a tiny saw means survival until rescue.

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American G.I.'s adopted the knife in World War II, brought it home to what would be its largest market.

Elsener's first models today, it would be immediately recognizable.

Elsener's mother, Victoria, died in 1909 and her name became the company trademark. In 1921, not long after stainless steel was developed, Carl Elsener II began using it in all of his knives and added the international designation for stainless steel, INOX, to the firm's name.

Just before the turn of the century an unlikely competitor appeared. The Rev. Theodore Wenger, a one-time master cutler, merged a number of small cutlers around the town of Delémont in a French-speaking part of Switzerland known as the Jura. Taking advantage of an obscure customs war between France and Germany, Wenger began exporting large numbers of his carving knives to France. Business boomed and in 1908 he began making pocketknives. That year the ever-neutral Swiss Army began buying half of its knives from the French region's Wenger and half from Victorinox in the German-speaking region.

Today Victorinox and Wenger remain the only two companies officially allowed to make real Swiss Army Knives and place Switzerland's white cross on the handles. Their rivalry is intense. Victorinox calls its product the "original" Swiss Army Knife; Wenger boasts that its is the "genuine" Swiss Army Knife. Victorinox produces 4.4 million a year in 98 different combinations. Number two and trying harder, Wenger produces 2.5 million in an astonishing range of 200 varieties, including a line of 10 models machined for left-handers. Wenger likes to point out that it originated magnifiers in the knives, that its scissors have a patented spring that doesn't fall out and that its models are more compact, by three-sixteenths of an inch. Still, Victorinox is the Hertz in this rivalry.

In all, 80 percent of the knives are exported, with American sales being by far the greatest—25 percent of Victorinox's output and 50 percent of Wenger's. After America, the biggest customers are West Germany, Canada, Great Britain and Japan. But the original military purpose continues. Each company supplies 25,000 Soldier's knives a year to new Swiss recruits. These still lack the elitist corkscrews of the Officer's model and sport a sturdy anodized-aluminum handle. Victorinox supplies the Nigerian Air Force with another version—this having a curved blade for slashing one's way out of tangled parachute cords. And in an irony that old Karl Elsener would have loved, Victorinox is now the official supplier of knives to the West German Army, the white cross replaced by the German eagle, the handle olive.

Because of the rising number and increasing quality of imitation Swiss Army Knives produced in Japan, China, Taiwan and the United States, Wenger and Victorinox are secretive about the details of how their knives are made. But gone are the days when they were crafted by hand; most of the operation is automated, many of the machines designed on the premises. Long rolls of French and German steel are fed into machines that stamp out the blades. Then they are ground to the correct thickness (with a tolerance of .02 millimeters), straightened, hardened, polished, assembled and inspected: 20,000 finished knives emerge daily from the Victorinox factory.

There are those who sniff at the Swiss Army Knife. John Markwell runs the Seneca Rocks Climbing School in West Virginia. "A lot of climbers use them, mostly for the tools," he says. "Not for the blade. Stainless steel doesn't make a good blade, do you think?"

It depends, of course. There are some knife snobs who wouldn't be caught dead with anything but a

Jake Page carries a Swiss Army Knife everywhere. Carl Hoffman, his son-in-law, fell in love while camping when he used one to trim the bangs of his future wife.

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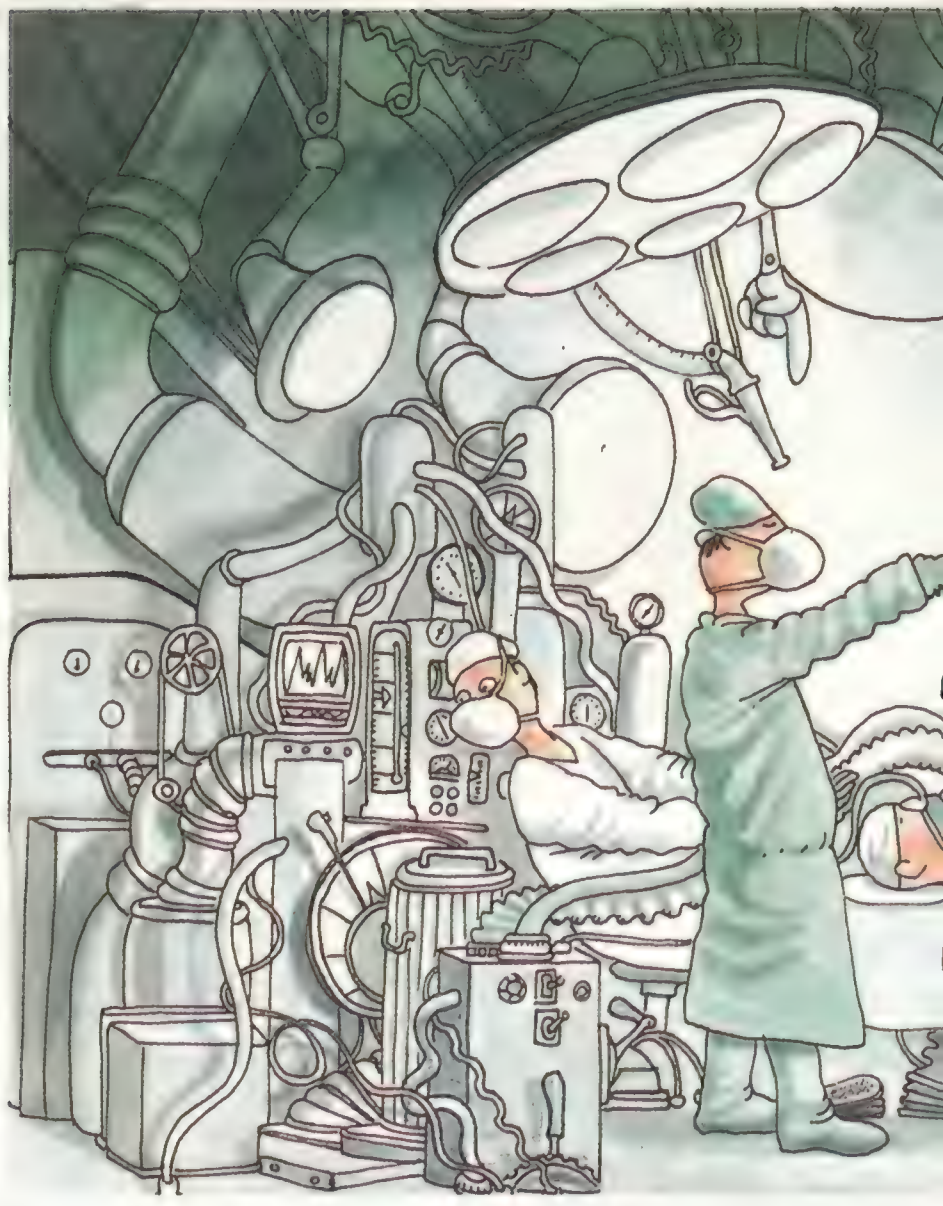
Purists place other knives on a pedestal, insisting that stainless steel does not make the best blades.



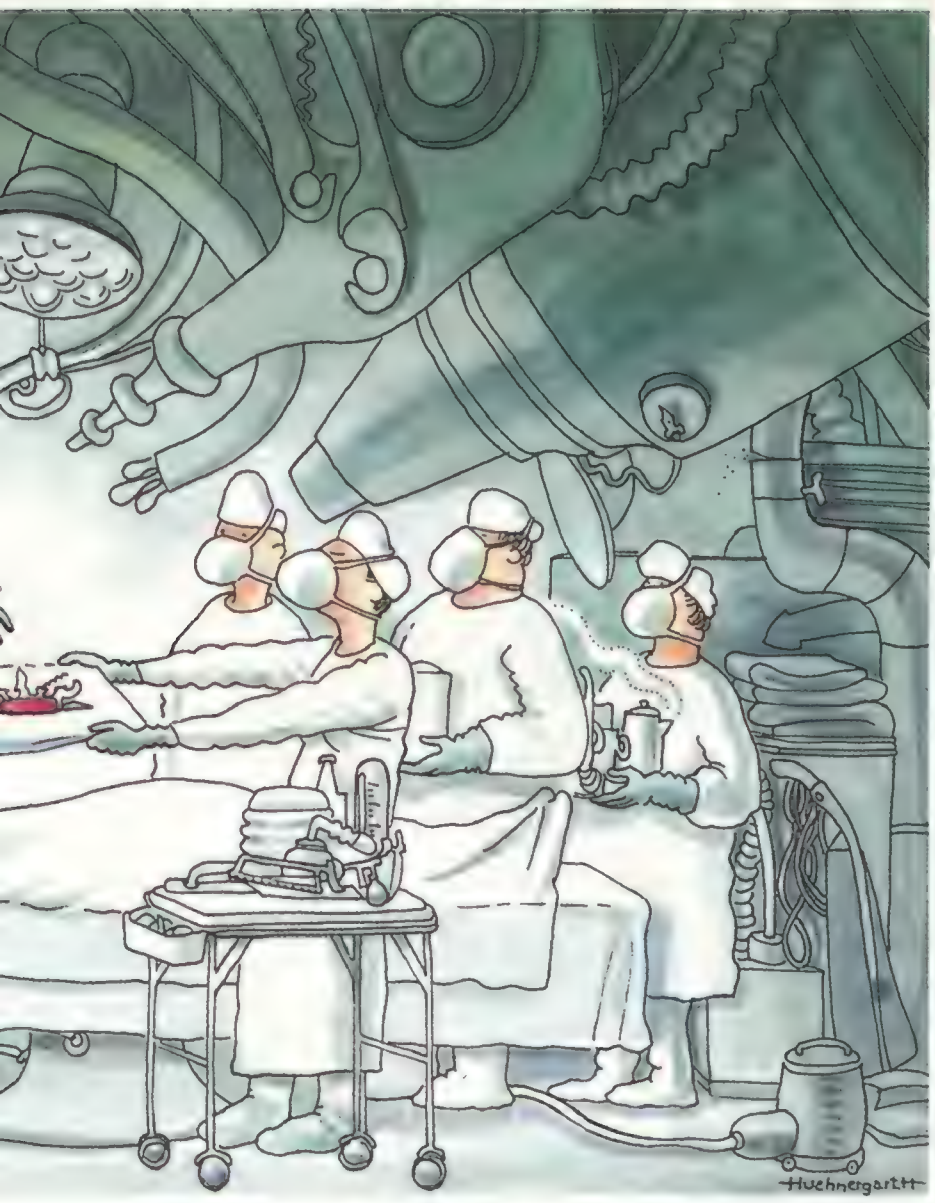
We can hope it never comes to this, but there are few jobs for which the Swiss knife has not been used.

hand-forged carbon-steel knife, properly hammered at red-hot temperatures to mix all the alloys, like kneading bread, and carefully tempered to achieve the correct hardness. Such a blade will measure somewhere between 57 and 60 on the Rockwell Scale of Hardness; a cheap blade will measure under 50.

Halter Cunningham, a graphic-arts mogul in the nation's capital and an avid hunter, took up the hobby of assembling hunting knives as gifts for his friends. For these, he uses only Randall blades (made in Orlando, Florida), the supreme hunting knife blades in the minds of many outdoorsmen. "I wouldn't give a friend a knife with any other kind of blade," Cunningham says. "A Randall blade is simply the best anywhere. There's nothing else to say about the subject."

How hard is the blade of a Swiss Army Knife? The manufacturers aren't about to say, any more than they will let on what recipe of steel and the likes of molybdenum, carbon and chromium their stainless steel is cooked up from.

"I'll venture a guess about their hardness," says Frank Shofner, owner of Shofner's World of Knives in



Albuquerque. "Around 59 or 60." The only people, Shofner adds, who worry about stainless-steel blades are "old people" who remember those of the 1930s and '40s. "You couldn't put an edge on them for anything. Nowadays they shouldn't even call it stainless steel. They should call it 'high-carbon tool steel.' It makes the best blades there are."

Yet the Swiss Army Knife has become part of the culture as an object of humor. A *New Yorker* cartoon had one opening up into a couch. A German newspaper showed one orbiting in space among satellites, its blades extended like antennas and solar cells.

NASA found the Victorinox Master Craftsman a no-nonsense tool worthy of spaceflight. It is part of the list of optional tools recommended by NASA for space shuttle astronauts. "There is no magical, mysterious reason why we fly the Swiss Army Knife," says NASA spokesman Brian Welch, "it's just considered to be a good general-purpose tool to have along."

It may be handy, but it simply isn't the knife for some applications. "A Swiss Army Knife? Wouldn't do me any good at all," says Lew Binford, an archaeologist at the University of New Mexico. Binford has been studying the Inuit for years. In return for showing him their hunting techniques, he offers to do the butchering. "You can't butcher an elk or a polar bear with a little itty-bitty blade like that. Anyway, the handle is too thick. And it would get all gunked up, you know, with blood and stuff. I know some Inuits who made their knives out of stone in the old days. Now they use a Buck Knife with two blades. That's what I use."

The Swiss Army Knife's popularity seems to have little to do with explorers or astronauts or art curators, and much to do with the knife's value in defeating the mundane terrors of everyday life. Not long ago a San Diego woman, Jan Wall, got a cactus spine stuck in her lip while gardening. Her husband, Rick, a schoolteacher, saved the day by pulling it out with his knife's tweezers. Not that he didn't have a perfectly good set of "real" tweezers in the medicine cabinet. "Just using my knife seems to make the job go better," he says.

Rick Wall is no common user of the Swiss Army Knife. He is the founder and president of the Swiss Army Knife Society (motto: *Semper Versatilis*). Most people would call him a fanatic. "When you go fishing you can't take your shotgun, when you go hunting you can't take your reel, but you can take your Swiss Army Knife on both; then you can come back to town and take it to your office," he explains.

Wall derived his fascination with the knives from his father and uncles. No matter where they were, Wall

They are both "official," but the two firms that make the knives work hard at keeping separate identities.

One aficionado offers to clip loose threads from women's clothing; his arrest record is not known.

recalls, the brothers would "whip out their Swiss Army Knives and see who had more attachments and new blades, or who could be the first person to fix some little thing at Christmas dinner."

Years later, Wall often hiked and camped in California's Sierra Nevada with an informal group of family and friends. Even as the group grew larger, the one thing they all had in common was an "excessive fondness" for their Swiss Army Knives. As a joke they started referring to themselves as the Swiss Army Knife Society. Because "we didn't want to do the research necessary to find out where they really came from," Wall says, they made up their own version of the "unlikely lore and legend of the Swiss Army Knife." The humorous stories eventually became the society's handbook, the *Swiss Army Knife Companion,* published in 1986. They placed an ad in *Outside* magazine and then "a weird thing happened. Instead of wanting to buy the books, everyone wanted to join the society."

Today there are 826 paid members. They live in all 50 states and eight foreign countries, including Australia and New Zealand. For $5 they get a parchment certificate, a membership card, four issues of the *Crimson Cutter* (its four pages feature everything from true-life "field reports" of knives in action to recipes and poetry) and, Wall's favorite benefit, "bragging rights." There is only one qualification: members must solemnly swear that they own a "genuine" or an "original" Swiss Army Knife.

Testimonials from true believers

Wall's mailbox is inundated with the kind of tales that have made the knives so dear to so many hearts. "Hi, my name is 'Bear,' " wrote Harry (Bear) Bair. "I don't like to see strings hanging from attractive women's clothing so I say 'Hi, Do you mind if I clip this unsightly thread?' Usually they are pleased."

Greg Harabedian summarized the knife's appeal: "I've found that when most people find out you carry one, they usually start out teasing you and laughing, but they don't laugh so hard when they end up asking you if they can use it for one reason or another."

The ultimate Swiss Army Knife fan might just be Fred Pickler, a law-enforcement products salesman from Hunt Valley, Maryland. He has collected more than 400 of them since 1985. It all started, he says, when he spotted a display case full of Swiss Army Knives in a South Carolina sporting goods store that was going out of business. The owner "saw a gleam in my eye and said he'd make me a deal." Pickler left the store carrying 24 knives. The display case had room for several models that were missing. In the course of trying to find them, he found still other models that he'd never heard of. One hundred knives later he realized, "My God! There's no end to them."

Pickler values his collection at more than $10,000. "I keep it in a vault," he says. He has a rare Watchmaker's model that has a half-inch-long blade "like an oyster knife" for prying off the back of a watch; a model with special blades for cutting cheese; 15 different models with mother-of-pearl handles; three knives that have the signatures and seals set in 14-karat gold from Presidents Lyndon Johnson and Ronald Reagan, and then-Vice President George Bush ("Someone offered me $3,000 just for those"); an original wooden-handled Wenger nearly 100 years old; and one of his favorites, a 30-year-old knife given to him in Australia by Ken McBroom, a pilot who had flown with it on seven around-the-world trips.

Pickler carries a Victorinox Swiss Champ wherever he goes. On the day we talked to him he had used it twice: to pick up a small screw that had fallen in a

Quality is Job 1.

Profile in quality #8:
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crack (he used the magnetic fish-hook disgorger) and to read the small print on a contract (he used the magnifying glass).

Part of the mystique of the Swiss Army Knife is its legendary quality. "You can abuse it and neglect it for a long time and it apologizes for you," is the way Pickler puts it. That indestructibility is what leads Victorinox's Ehrler to believe that there must be millions and millions of people who own knives now. "Hopefully," he says with a laugh, "they will lose some of them."

Both Victorinox and Wenger guarantee all their knives for life; if any part breaks they will repair it free. That is, providing "Victorinox, Switzerland, Stainless Rostfrei" or "Wenger, Delémont, Switzerland, Stainless" is stamped on the largest blade's shank. The number returned to Wenger is "less than 2 per 10,000," according to John Bergeron, who handles American imports. Of those returned to Victorinox, Ehrler says, "most are from people who attach great sentimental value to their constant companion which they kept in their pocket for years. If we tell them 'It's much cheaper for us to send you a new knife,' then they say, 'Well, thank you, but we would very much like the broken part repaired.' For us it's a waste of money. But what can you do?"

On Easter 1982, Ranulph Fiennes reached the North Pole during a three-year, 35,000-mile, sea-and-land circumnavigation of the Earth via the poles. "I was trying to put in a flag and it wouldn't stick because it was solid ice. We thought, because we were getting very, very cold, that we must get it in there to take a photograph before we could move on. So I took out my Swiss Army Knife to try and make a little slit between two ice boulders so we could jam the flagpole inside before we froze to death." At that historic moment the knife blade snapped. "That," says the world's greatest living explorer, "was the first time and the last time I've ever snapped a Swiss Army Knife."

Like satellites with all their "antennas" extended,
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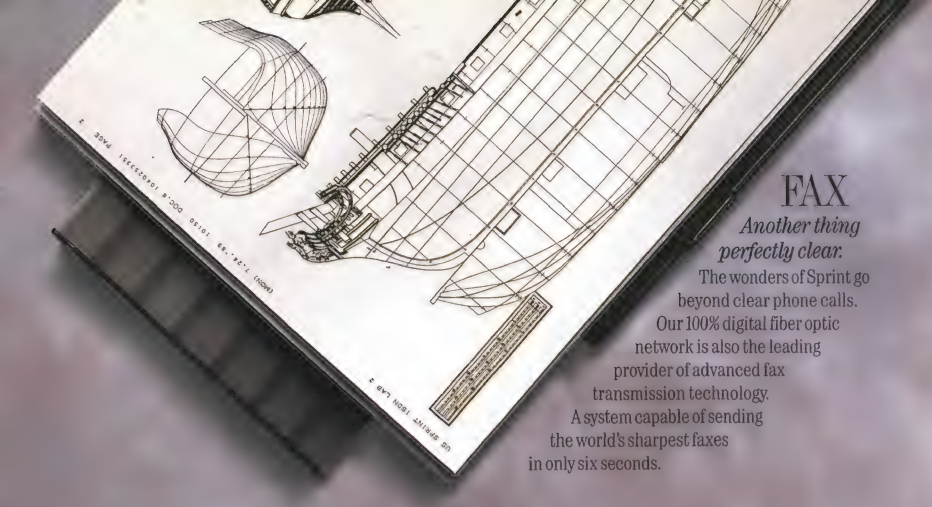

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By Stanley Meisler

The lively rebirth of a battered but indomitable Glasgow

Economic blows and urban blight savaged the great city, a fortress of Victorian grandeur, but now things are looking up

Statue of railway worker and child symbolizes the city's locomotive-building past and burgeoning new hope.

Many residents of once-gray-and-rotting Glasgow like to believe that their renaissance began with the great storm of 1968. Winds of almost 125 miles an hour buffeted the largest city of Scotland in the middle of a chilling January, damaging thousands upon thousands of tenements, smashing down chimney stacks and hurtling them through the roofs of the buildings. Several tenants died under the crashing debris. Grimy, battered Glasgow lay at the nadir of its hopes.

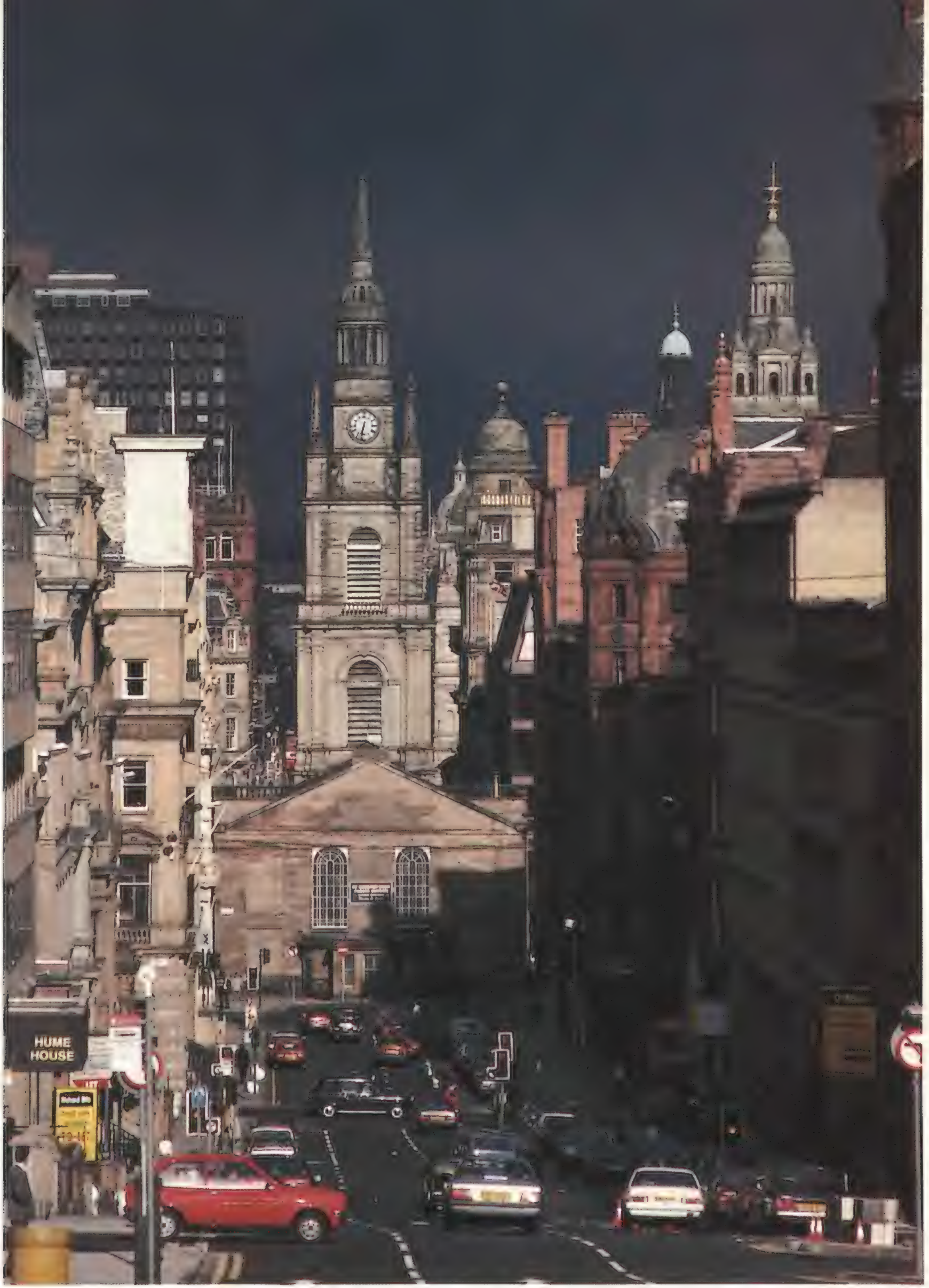
Forces other than the storm may have played a more significant and practical role in the remarkable rebirth of Glasgow. But the idea of the storm galvanizing them into action fits neatly into the image that many Glaswegians have of themselves—a tough, gritty people overcoming adversity throughout history. Scottish novelist William McIlvanney once described Glasgow as a city of survival that "danced among its own debris." "When Glasgow gave up," he wrote, "the world could call it a day."

For decades, no British city symbolized the humbling of great industry, the bleeding of enormous wealth, the loss of Victorian grandeur and the despair of urban blight like dirty, mean, dying Glasgow. Now, to the astonishment of many, this city is about to reign as the 1990 European City of Culture. The honor may not be as grand as it sounds, but only a fool or a comic would have predicted such an idea, say, 20 years ago. "Now people are proud to say they are from Glasgow," said Bill Miller, the bearded young politician who is a member of the Strathclyde Regional Council. "Twenty years ago, they would have said they were from the west of Scotland."

The transformation seems swift. John Watson, a Glasgow town planner, keeps in his desk a pair of Sunday magazines from two of Britain's most influential newspapers. The cover of one, published by the *Observer* on January 22, 1978, sets a ragged, impoverished woman against a slum of filth and grime. "Home, Rotten Home," the title cries out. "What it's like in the worst corner of Britain. This woman was photographed from the block of Glasgow flats where she lives."

Watson likes to place the second magazine alongside the first. Published by the *Sunday Times* on August 7, 1988, only a decade later, the cover features a montage of gleaming, imposing architectural landmarks, both Victorian and modern, and asks in wonderment: "Can This Be Glasgow?" Inside, an eight-page article almost gasps in excitement over the renaissance of Glasgow. For Watson, the two covers are evidence enough of the incredible changes that have been wrought in the briefest of times. "It is a vigorous city, this," he declared.

Glasgow, though still poor, is now an energetic city of 725,000 that restores and protects its monumental Victorian center, orders its transformation of slums in a thoughtful, caring manner, encourages a host of cultural activities, boasts exquisite collections of art, including a remarkable array of Whistlers, works diligently to attract high-tech and service corporations to take the place of moribund heavy industry, and pro-



Looking east, the view is of the back of St. George's Tron Church in center of city. Beyond, at left, is a tall, modern building on University of Strathclyde campus. At right is gold-finialed Glasgow City Council tower.

Photographs by Patrick Ward

motes itself unabashedly. It is an astounding turnabout.

Yet the change must be put in perspective. Glasgow, Scotland's foremost industrial city of rust, did not turn itself into a tinseltown. The mood of the city is still down-to-earth, hard work, no airs. The patrons who crowded into the Theatre Royal last Christmas for the Scottish Opera production of Gilbert and Sullivan's *Iolanthe* wore heavy wool coats, not furs. There is a saying in Glasgow used to deflate anyone who is found to be putting on airs—"Ken't his faither" ("I knew his father").

Glaswegians do not conceal their resentment and contempt for their fellow Scots in the capital of Edinburgh, a genteel and lovely city of almost 500,000, less than 50 miles to the east. One of Glasgow's best-known journalists, 82-year-old Jack House, insists it is easy to tell the difference between a Glaswegian and an Edinburgh man. "When you show up at a Glasgow home," said House with his elfin smile, "the host says, 'Come in and have your tea.' When you show up at an Edinburgh home, the host says, 'Come in. You will have had your tea.'" Glaswegians do not hide their annoyance at all the arty people lavishing attention every summer on Edinburgh for its renowned festival while ignoring the opera, ballet, orchestra and drama companies permanently in their city. Not the least of the joys that came with Glasgow's designation by the European Community as the 1990 European City of Culture was the satisfaction of pushing Edinburgh aside.

The second city's days of glory

Glasgow, crashing from great heights, has seemed close to giving up several times in its history—a history that cannot be separated from that of Victorian capitalism and the Industrial Revolution. Adam Smith, after all, the apostle of free trade and laissez-faire capitalism, taught at the University of Glasgow in the mid-18th century, and James Watt, the inventor who spawned the Industrial Revolution, perfected the steam engine while working as an instrument maker at the same university at about the same time. Glasgow became one of the great industrial cities of Britain in the 19th and early 20th centuries, and liked to boast for more than a hundred years that it was "the second city of the Empire"—second in population only to London.

Glasgow reached its heights of Victorian power only after a pair of economic disasters—both set off by violence in America. The American Revolution destroyed Glasgow's role as the prosperous center of tobacco trading for the American Colonies. The American Civil War, less than a century later, choked off almost all supplies of raw cotton and crippled its textile industry. Undaunted Glaswegians not only revived the economy but powered it to a new era of industrial might.

Coroneted doughty dowager, once a library, now a nursery, is preserved in former Gorbals slum section.

Brand-new 46,000-ton container ship ordered by the People's Republic of China is launched with no fanfare.

Glass-canopied, the up-to-date St. Enoch shopping center, at 280,000 square feet, is the largest in Scotland.

In days of shipbuilding glory, occasion would have been marked by a champagne celebration and music.

Its 19th-century entrepreneurs turned to heavy industry, especially shipbuilding along the Clyde River, which twists into the city and sunders it in two like the Seine in Paris or the Thames in London. Glasgow became one of the great shipbuilders of the world.

But the prosperity and power could not last long into the 20th century. More efficient and economical foreign shipyards began to compete to build the world's tonnage. After World War II, Glasgow turned into a postwar city of massive unemployment and emigration, dwindling in size and importance.

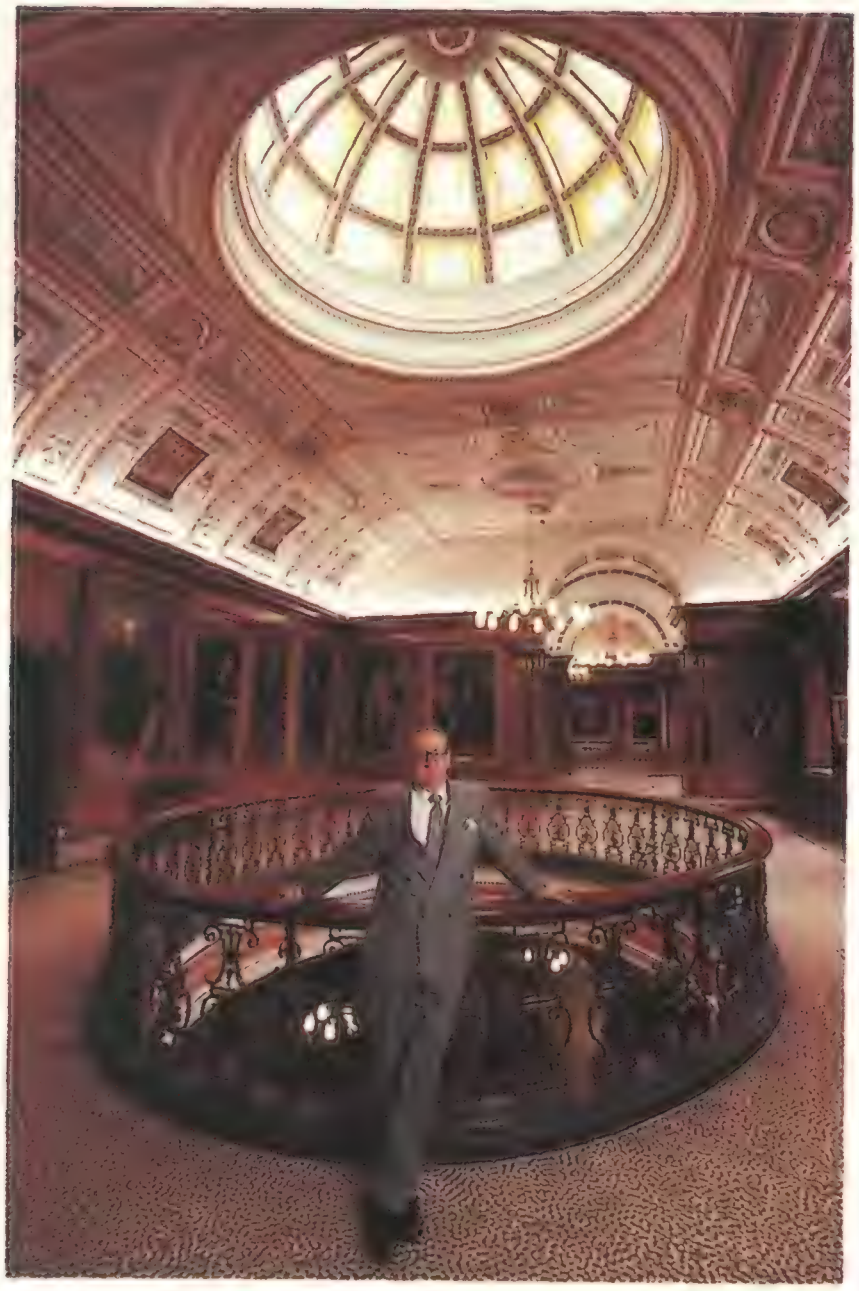
Glasgow's ghastly Gorbals

There had always been great pockets of poverty alongside the industrial prosperity of Glasgow. "I have seen human degradation in some of the worst places, both in England and abroad," wrote the stunned author of a parliamentary report on housing in 1839, "but I did not believe until I had visited the Wynds [district] of Glasgow that so large an amount of filth, crime, misery and disease existed in one spot in any civilized country."

Later, the Gorbals, a teeming, squalid quarter of slum tenements just across the Clyde from the town center, took on such notoriety that it became the metaphor for Glasgow in the 1930s and '40s and most of the '50s. No writer could describe Glasgow without measuring the blight of the Gorbals.

Ralph Glasser, a psychologist who grew up there in the 1930s, has described the Gorbals as "a place of grime and poverty" where "violence . . . simmered and bubbled and boiled over." The streets were crowded and noisy, clanging with the bells of trolleys. The Gorbals bustled with workshops, factories, pawnshops, pubs, public baths, a wash house, many churches, a few synagogues, and the ubiquitous little hand-to-mouth shops of grocers and bakers and butchers and fishmongers. Most people lived in four-story, Victorian-era tenement houses with at least three families on each floor. A family sometimes had no more than a single room to itself, with a large stove against one wall, and narrow beds and mattresses taking up every inch of the floor at night. "Splintered and broken floor boards sometimes gave way under your feet," Glasser wrote in his autobiography. "The minimal plumbing hovered on the verge of collapse. . . . Rats and mice moved about freely."

The Gorbals and its tenements symbolized the shame of Glasgow so starkly that town planners could conceive of nothing else to do with the neighborhood after World War II but obliterate it. They wiped out the Gorbals in furious haste. One official won the nickname "Charlie the Razer" because of the speed with which he condemned tenement buildings and



Spokesman Harry Diamond, once "the man with the toughest job in Scotland," stands in City Chambers.

Sprawling Glasgow Art Gallery is one reason the city has been named 1990 European City of Culture.

rushed the bulldozers at them. Officials sent the tenement dwellers to new towns developed by the government outside Glasgow, to housing estates in the far reaches of the city and to clusters of high-rise apartment buildings hurriedly built all over Glasgow, even within the Gorbals itself.

A walk through the Gorbals today reveals a lifeless, bloodless area of stark ugliness. The old teeming neighborhood has been replaced by a desolate landscape of near-empty, rock-strewn blocks with isolated structures, like ancient ruins, still standing here and there. Glaswegians who once lived there curse in frustration and resentment as they try and fail to find the site of the house where they grew up.

Many Glaswegians admit to feeling a sense of nostalgia and bitterness over the loss of the Gorbals and its tenements. A returning Ralph Glasser could not hide his anguish at the way "the whole of the Gorbals was wiped off the map . . . leaving a desert" on which "they erected a few twenty-four-story tower blocks, somber monoliths presiding over windswept vistas of sparse, muddy, littered turf. . . ."

By the 1960s, Glasgow dropped to the depth of its fortunes. It had removed the blight of the Gorbals but won little more than bitterness for the trouble. Even without the Gorbals, it still was a symbol of the decline of Britain. Many foreigners, in fact, probably did not know or care that the Gorbals was gone. Glasgow was still a poor, deteriorating city with many more blights than the Gorbals to deal with and few ideas about how to do so. There seemed little hope. Yet the renaissance came. How did it all come about?

It is not clear why many Glaswegians believe the terror of the 1968 storm galvanized them into action. Some say it made them realize their sentimental attachment to what they had lost. Others maintain that the

Stanley Meisler, correspondent for the Washington bureau of the Los Angeles Times, *wrote about the artist Chaim Soutine in* SMITHSONIAN, *November 1988.*

Opened in 1902, it is one of seven museums and galleries in the city: Beyond are cranes on the Clyde.

Former Lord Provost Michael Kelly, university lecturer, sports umbrella with smiling face, Glasgow motto.

emergency drove home the lesson of restoration; city officials had no time to tear down and replace buildings but only to repair them. In fact, the storm's destruction probably did little but make clear how low Glasgow had sunk. Although no one seemed to know it, more powerful and uplifting forces than the storm were ready to sweep through Glasgow.

The first was the power of history. Unable to fathom its future, Glasgow rediscovered its past. All of depressed Scotland, in fact, felt a resurgence of Scottish nationalism. Glaswegians began to notice the majesty and beauty of the Victorian city that lay beneath all the grime and soot. The British Clean Air Act of 1956 and the decline of heavy industry cleared up enough of the air to encourage people to look around them, and officials to contemplate scrubbing the black from the walls. In 1968, two local architects, Andor Gomme and David Walker, published a book warning that "Glasgow has been, and still is being, terribly mauled."

The architects described the wonders of Glasgow—the pleasant Victorian power of a town center set on hills, the towers and cupolas and 19th-century ornamentation of its banks and mansions, the antique warehouses, the crescent blocks of stately, upper-class tenements, the classical templelike churches of Alexander (Greek) Thomson, the great stone and iron bridges over the Clyde River, the delicate and strange fin de siècle art of Charles Rennie Mackintosh—and demanded preservation, restoration and cleaning.

Much of the warning was heeded. Pressured by voters who did not want to lose their past, city officials began to offer incentives and subsidies to encourage cleaning, restoration, the preservation of facades, and even floodlighting at night.

So much restoration was attempted that the town center began to look as though it were under permanent scaffolding. With the grime and soot gone, Glaswegians, for the first time, could see the honey-colored and pearly-gray and red sandstone of their great buildings.

While Glasgow felt all this power of the past, a second force, a creative revolution in town planning, swept the city. "The commonly held belief in 1973 or 1974," said Keith Yates, a senior executive with the Strathclyde Council, "was that Glasgow was in terminal decline." Yet, the very bleakness of the prospects offered advantages to town planners. So little had worked before that anything seemed worth trying.

In 1976, the national, regional and city governments agreed on a planning strategy for Glasgow. They would stop the creation of new suburban towns that were siphoning off the population of the city, and of new suburban shopping malls that were pulling customers from downtown, and they would concentrate instead on making more of the city livable and shoppable. If you do not count cities forced to rebuild because of destruction by war or natural disaster, Glasgow town planner John Watson reported to a recent international conference, "Glasgow has gone about rebuilding itself on a bolder and larger scale than any other city in the world" in the 20th century.

A wave of unabashed promotion—the third force in the Glasgow revival—swiftly followed all the feverish planning. An American management study in mid-1980 told Glaswegians what they probably knew already: if the old industrial city of Glasgow revived economically, it would do so only as a modern city of service—persuading corporations to set down their regional headquarters there, attracting visitors to conventions and culture, encouraging entrepreneurs to invest in small, high-tech enterprises. In line with this, Michael Kelly, a young, redheaded university lecturer who had been elected Lord Provost, or mayor, launched a campaign—patterned after "I Love New York"—featuring a round, grinning, silly, yellow figure who proclaimed "Glasgow's Miles Better."

The campaign would have been squelched by ridicule and derision two decades earlier. But Glaswegians, by now, had started to believe that perhaps they really were somewhat, if not miles, better off. So did many Britons. "In the old days," said Harry Diamond, the longtime director of public relations for the City of Glasgow, "the BBC would always film here whenever they needed a dirty, decrepit, ugly setting. Now they have to use Birmingham."

As the largest city in Scotland, Glasgow had long

Students browse in library of Glasgow Art School, considered to be the masterpiece of Scottish designer and architect Charles Rennie Mackintosh. Celebrated today, he received little acclaim during his lifetime.

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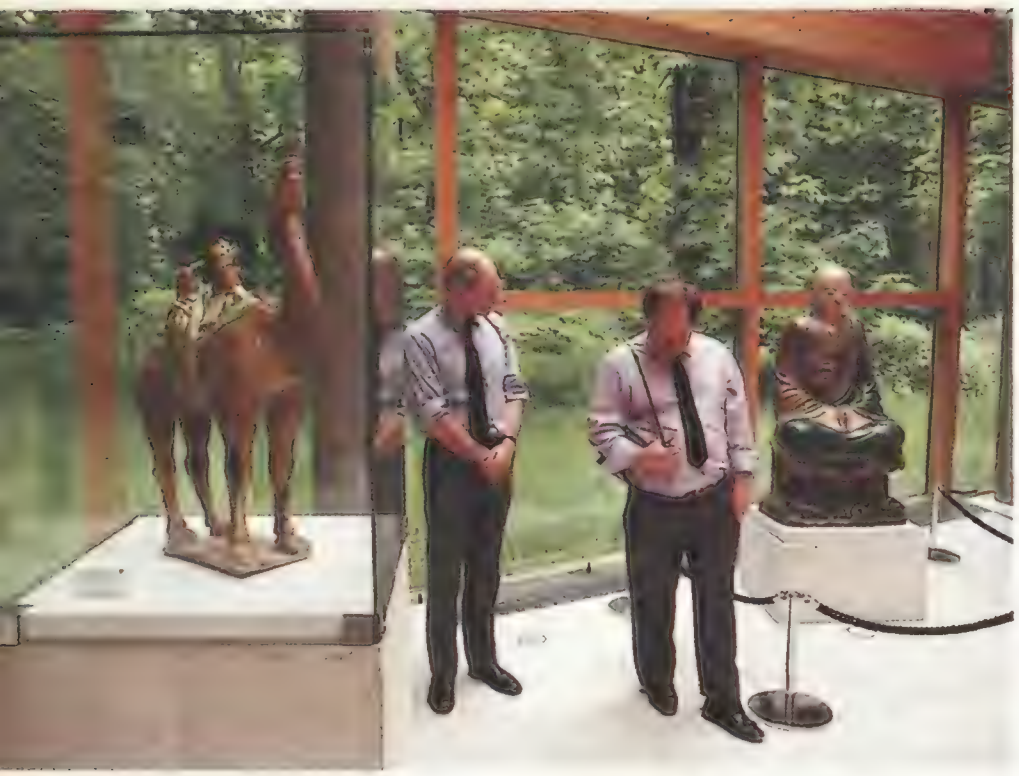

Visitors contemplate art in the Burrell Collection gallery, donated by ship magnate Sir William Burrell.

Hunterian Art Gallery is famous for its collection of Whistlers, bequeathed to it by the artist's sister-in-law.

been a regional center of culture, with the Scottish National Orchestra, the Scottish Opera and the Scottish Ballet all headquartered there. Yet, it was still regarded as an audacious act when city leaders put Glasgow forward as a candidate for the coveted City of Culture award.

The European Community had started designating Cities of Culture in 1985, allowing each member nation a turn at naming its own. The early choices were obvious: Athens in 1985, Florence in 1986, Amsterdam in 1987, Berlin in 1988 and Paris in 1989. When Britain's turn came, Prime Minister Margaret Thatcher's government decided to hold a competition. At first Glasgow hesitated. "People looked at the other Cities of Culture—Athens, Florence, Paris—and wondered if they were in *that* league," said David Macdonald, executive director of Glasgow Action, a local organization of businessmen and politicians that promotes development of the new Glasgow.

But the politicians and officials of Glasgow swallowed their hesitation and hurriedly put together a persuasive plan that promised a yearlong festival of culture in a city of Victorian splendor. To the surprise of many Glaswegians, the British government selected Glasgow over eight other cities, including Edinburgh. The scenario had a kind of logic, yet, at the end, Glaswegians could not hide their awe at the thought of taking over the title from a city like Paris.

The festival of theater, concert, opera and ballet will celebrate the renaissance of Glasgow, and may cost the city, and other government and corporate sponsors, more than £40 million. "It's costing us a bloody bomb," Charles Gray, the Strathclyde Council Leader, says happily. A number of pleasant surprises await the hundreds of thousands of visitors, for dirty, grimy, sooty Glasgow always housed some of the finest art in Britain, outside London. Aside from the stately Victorian architecture, Glasgow keeps the work of Charles Rennie Mackintosh, a breathtaking number of portraits by James McNeill Whistler, a distinguished selection of 19th-century French paintings, and the eclectic collections of the wealthy, frugal shipowner and shiptrader Sir William Burrell.

During its mood of rediscovery and historical introspection, Glasgow once more came upon Charles Rennie Mackintosh, probably the city's most accomplished and most neglected architect and designer. In 1968, the Scottish Arts Council and the Edinburgh Festival Society commemorated the 100th anniversary of his birth with an exhibition, but it was mounted in Edinburgh, not Glasgow. It is hard to imagine Glasgow shut out of any Mackintosh celebration again—especially by Edinburgh. Since the flurry of publicity over the centenary, Glaswegians have embraced their own. The city is now intoxicated with Mackintosh. Replicas of his furniture and jewelry are sold in shops, the fashionable mimic his Art Nouveau script in announcements and invitations, enthusiasts flock to the few ex-

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amples of his spectacular work, the city features the facade of his art school and the slim chairs of his tearooms wherever it advertises itself. Mackintosh, in fact, has become the metaphor for new Glasgow, the way the Gorbals once was the metaphor for old Glasgow.

Although Mackintosh was neglected during his lifetime, his best-known work, the Glasgow School of Art, thrived. Touring the school these days is an exciting experience, for a visitor finds that this building, which Mackintosh designed inside and out, still functions exactly as he intended and has done so for almost a century. At the school library, for example, with its wonderful hanging lamps, students still sit on the slat-backed chairs designed by him and built at the turn of the century. Lifting one up recently, Peter Trowles, curator of the Mackintosh Collection, commented, "This could fetch £5,000 at an auction."

The Glasgow Boys, a school of local painters in the late 19th century, idolized Whistler and persuaded the Glasgow Art Gallery in 1891 to buy his portrait of Thomas Carlyle, *Arrangement in Gray and Black No. 2* (*No. 1* was the famous portrait of his mother, now in the Louvre in Paris). This early Glasgow loyalty—the Carlyle portrait was the first Whistler purchased for a public collection in Britain—was rewarded a half-century later when the artist's Scottish sister-in-law and heir, Rosalind Birnie Philip, turned over the Whistler legacy to the University of Glasgow. Whistler had felt so ignored by the English before he died in 1903 that Rosalind would not donate his work to any English institution. The university's Hunterian Art Gallery now displays a collection of Whistler paintings second only to that of the Smithsonian's Freer Gallery of Art.

Since 1983, the city has trumpeted its renowned Burrell Collection, now displayed in a modern museum in Pollok Park after decades of obscurity in boxes in storerooms. It was amassed during 80 years of careful purchasing by Sir William Burrell, who was drawn to medieval and gothic stained glass, tapestries and sculpture; Renaissance furniture; Chinese ceramics, bronzes and jades; paintings by 19th-century French artists and much else. He prided himself on caution and haggling, and averaged no more than £20,000 a year of purchases, keeping precise handwritten records in a ledger.

Burrell, who died in 1958 at the age of 96, donated his collection to the city of Glasgow in 1944. But, worried about the pollution of his native city, Burrell left in the deed for the gift the unacceptable stipulation that the collection would have to be housed in a building at least 16 miles from the center of Glasgow.

The issue lay dormant and the collection lay neglected for a number of years. It might have remained that way without the renaissance of Glasgow. With the splendor of the city restored and the air finally clean, and the soot and grime only a memory, city officials decided that they would not break the spirit of the bequest if they housed the collection in a park only three miles from the center of town. Soon, like Charles Rennie Mackintosh, the sprawling structure of stone, glass and steel that houses the Burrell Collection became a symbol of modern Glasgow.

Glasgow in renaissance is hardly a paradise. The *New Statesman*, an influential leftist magazine in Britain, recently mocked the "Glasgow's Miles Better" campaign and its grinning yellow logo with a cover story called, "A Stupid Wee Smile." The 1990 European City of Culture, the magazine insisted, was still "a city in deep economic crisis." Almost 17 percent of the Glasgow workforce was unemployed in 1988. Regional statistics show that 28 percent of the total population of Strathclyde was poor enough to qualify for poverty benefits in 1986.

All the self-promotion in such times troubles some thoughtful Glaswegians. Patient, dedicated Patricia Douglas, who runs the Charles Rennie Mackintosh Society, occasionally shows her worry. Sitting in the Mackintosh-designed Queen's Cross Church, which serves as society headquarters, she said, "When everyone tells you how great you are, you are liable to believe it, and that's fatal." Yet Glaswegians still have a right to measured optimism. "Of all the declining cities in Britain," said Strathclyde Council planner Keith Yates, "Glasgow is the city that turned itself around the best. But it still has a long way to go." His enthusiasm makes it clear that he, like many other Glaswegians, believes that Glasgow can make it.

Union Railway Bridge, completed 1902, evokes a sandstone stronghold spanning Glasgow's Clyde River.

THE MING DYNASTY AND THE SPACE STATION

In 1492 China discovered Europe.

This is the way history might have been written but for a sudden and fateful change of policy on the part of the Ming Emperors.

In the early 15th century China was the most advanced power on Earth. The Middle Kingdom led the world in such decisive technologies as gunpowder, printing, metallurgy, engineering, and medicine.

Navigation was also in China's strong suit. From 1405 to 1433 vast Chinese fleets, which would dwarf much later European expeditions, were already exploring and opening up trade routes westward. By 1431

View of the Imperial Court, Beijing, Anon. 17th Cent., Bibliotheque Nationale, Paris

a fleet of sixty-two ships and 28,000 men had reached the east coast of Africa. It was only a matter of time before the Chinese discovered Europe.

Then, in a sudden policy reversal, the Ming Emperors halted all further voyages and began to foster an atmosphere of xenophobic conservatism. Science and technology decayed. Trade became passive. And the next five centuries saw China become one of the world's exploited nations.

The United States now also finds itself at a critical time in history. So many domestic and defense needs make investment in space exploration seem, by comparison, of lower priority. The funding of our orbiting space station, indeed, our whole space program, seems to be politically in doubt.

One thing that is inevitable, though, is that humans will continue to reach out into space. It is in our nature. And whether space is explored by the United States or the Soviet Union or Europe, it will be explored.

Had the Ming Emperors not hamstrung China five hundred years ago, history undoubtedly would have taken a dramatically different turn. But their moment was lost.

The direction the United States now takes into—or away from—space will have implications for our fate during the next five hundred years. Our moment is now.

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Giving shape to imagination.

Graceful Tomentosa cherry (*yusura-ume*) is actual size; keeping it small requires careful attention. After spring blossoms, leaves turn emerald green and berries form. Curved trunk, Chinese pot add to beauty.

By Ogden Tanner

Bonsai: a way of looking at trees with different eyes

For centuries Japanese and Chinese have been creating these remarkable miniatures; now Americans are trying their hand, too

Behind the walls of the Minnesota Correctional Facility at Stillwater, Tom Chappell and 17 other members of the prison's bonsai club spend a couple of hours each night working on their collection of tiny, picturesquely twisted trees.

"It gets your mind off other things," says Chappell, who is serving 15 years to life for second-degree murder. His prize juniper, which he trained for two years, won a blue ribbon at the Minnesota State Fair last year; with the help of other ribbons earned by fellow inmates, the club swept the competition in the novice class. "Most of these guys are lifers with a history of big trouble," observes Sgt. Mike Hermerding of the prison staff. "But we've had surprisingly few problems since they got involved in bonsai."

When he isn't performing surgery at Columbia Presbyterian Medical Center in New York City, orthopedist David Andrews can usually be found operating on his own collection of bonsai in Alpine, New Jersey. "I spend all day making crooked limbs straight, and all night making straight ones crooked," he quips. "Practicing bonsai has given me a certain amount of balance."

North of Memphis, retired Air Force Maj. Gen. Billy Smith and his wife, Robbieanna, maintain 150 little trees in shallow trays; some they have acquired in their present form, but many others they have trained themselves, including a beautifully branching native buttonwood they think may be 300 years old. Smith originally became intrigued when he was flying back and forth to Japan on active duty 20 years ago and saw his first bonsai in a Tokyo department store. "There's something about bonsai, like flying, that's very quiet and peaceful," he says. "I've never tired of doing either."

A little tray-planted tree

Prisoners and professionals, retirees and housewives, more and more Americans have become fascinated by the ancient art of *bonsai* (pronounced "bone-sigh"), a Japanese word that means "tray planting."

Just how many Americans are bonsai buffs is anyone's guess, though they certainly number in the tens of thousands. There are upwards of a hundred organized bonsai clubs around the country—some 70 in California alone—and perhaps as many as a thousand small groups of individuals who meet informally at one another's homes. The movement is gaining international momentum as well. The first World Bonsai Convention was held last April in Japan, drawing 1,600 enthusiasts from 32 countries, including the United States, West Germany, Australia, India, Argentina and Peru.

Bonsai, admittedly, is not for everyone. Though a well-cared-for miniature tree is as healthy as—and often longer-lived than—its larger forest brethren, some people are slow to get over the notion that all that twisting, wiring and pruning must constitute a form of torture, vaguely akin to the old Oriental custom of binding women's feet to make them small. Not a few people unfamiliar with the art are apt to regard the more contorted specimens as simply weird, even a bit grotesque.

"When you see bonsai for the first time, you either fall in love with it instantly or you don't; there's no middle way," says Chase Rosade, who studied bonsai in Japan, and teaches it to both beginners and experts at the Rosade Bonsai Studio in New Hope, Pennsylvania. "The people who do fall in love with it, however, find that they can escape in their imagination into a natural world in miniature. For a moment, a foot-high tree resembles a wind-tormented pine high on a mountain; a mound of moss becomes a green meadow; a group of seedlings evokes an entire forest."

In Japan, where religion teaches a reverence for nature, age and ancestors, bonsai is a highly respected art form, symbolizing the struggle of a tree against the forces of nature, growing in character as it grows older, much as a human being does. Moreover, in common with other Japanese artworks, such as scroll paintings and gardens, a good bonsai is not explicit down to the last detail; it is spare, abstract, impressionistic, inviting the observer to meditate, to project himself into the scene, to complete and interpret it in his own mind. In many Japanese homes, a favorite specimen is often brought indoors temporarily and placed in a tokonoma, a ceremonial alcove where it can be contemplated at leisure, perhaps with a decorative poetic scroll hanging behind it, and a small companion plant or other object completing the composition off to one side. The man of the house comes home after a frazzling day at the office and sits in front of this world in microcosm for five or ten minutes before dinner. "That's his martini," observes David Andrews. "He can imagine himself climbing a beautiful mountain, or walking quietly in the woods."

Though many women are attracted to bonsai in America, it seems to have its greatest allure for men who, according to suppliers of bonsai plants and materials, constitute the vast majority of their clients. This

Fireman Dan Robinson, apostle of unconventional new style, trims centuries-old Rocky Mountain juniper.

Bonsai entrepreneur Chase Rosade (right) introduces student to intricacies of the art of wiring branches.

tradition, too, stems partly from Japan, where virtually all practitioners are male (and where ikebana, the art of flower arranging, is almost exclusively a female pursuit).

Not a few devotees talk about their plants as if they were children or pets, members of the family. One reason is the constant attention they need: growing in unnatural conditions in shallow containers, plants usually require daily watering and inspection, often a little pruning here and there, as well as occasional fertilizing, root trimming, and periodic repotting to keep them healthy and within bounds. Unlike watercolors or model airplanes, bonsai is not a hobby one can drop readily to go off on a trip. For those who can't persuade someone to baby-sit their plants, a number of bonsai nurseries around the country offer vacationing owners "boarding and grooming" services, much as kennels do for owners of prize poodles.

The challenge is not one that stops once you've put down your tools and stood back to admire the result. Unlike a sculpture or painting, a bonsai continues to grow, changing with the seasons and the years. Buds develop, shoots lengthen. In some species, flowers open, fruit appears, foliage turns color in fall. When the leaves drop, the architecture of a deciduous tree like a maple or beech is dramatically exposed, becoming an object of wonder in itself. "Once you're hooked on bonsai, you start looking at trees in the landscape with different eyes," says Robbieanna Smith. "You realize how much more beautiful a tree like a sycamore can become in winter, when the leaves aren't covering it and you can appreciate the trunk lines, the branches, the texture and colors of the bark. I find I have to buy an awful lot of right front tires, because when I drive along the street every day I see things that would make wonderful bonsai and I run right into the curb."

In Japan, bonsai are family heirlooms

Underlying the appeal for many converts is the mystery of working with something that is so small, so beautiful, so often old, yet so very much alive. While some bonsai in Japan, lovingly passed on from father to son as family heirlooms, are thought to have been living for 500 years or more, the question to a true believer is not so much the actual age of a plant as how old it *looks*. "It takes at least three generations to make a really good bonsai," says Johnny Chang, who displays a dozen or so of his 140 specimens in his Chinese restaurant in Greenwich, Connecticut, for diners to admire. Other practitioners find that they can achieve a feeling of age and dignity in a plant in as few as five or ten years. In any case, patience counts.

To create a bonsai out of a young nursery plant, an expert like Chase Rosade first looks for a tree with a trunk that is somewhat thicker at the base and tapering

toward the top, a strong root system all around, and an interesting natural "movement" to the trunk and branches. The best time to shape a plant is in early spring, when it is vigorous and starting to put out new growth. Because the plant may be so full of sap that it is actually brittle, Rosade doesn't water it for a day or two, allowing it to become less turgid and thus less likely to snap if bent.

When he is ready to go to work, Rosade uses special bonsai scissors and pruning pincers to remove excess foliage and branches. He begins at the bottom, working upward so that roughly the lower third of the trunk is revealed. If the tree lends itself to the common "curved-trunk" style, he leaves one major branch to the right (or left); a second, shorter branch above the first, protruding to the other side; a smaller third branch above the second, pointing toward the back of the tree to give a feeling of depth. He avoids branches pointing awkwardly at the viewer except for the smallest ones at the top. "You want to open up the foliage so you can appreciate the structure of the tree—as the Japanese put it, to make 'spaces for the birds to fly through,' " he says.

On each main branch, Rosade shapes the foliage into a triangular or teardrop shape, thicker toward the trunk and tapering toward the tip; he also snips off shoots that point straight up or down, in order to achieve a flatter, layered look.

A rigidly straight trunk or a branch that angles upward may have to be wired into more pleasing lines characteristic of an older tree. Wiring, a temporary measure akin to putting braces on teeth, is done with soft copper or aluminum wire. Starting from the base, Rosade wraps the wire in a series of 45-degree turns toward the tip. After wiring, he gently bends the wood with both hands into the desired position, which the bent wire should hold until the wood takes on the new position permanently. On a particularly resistant limb, he may attach a guy wire to the trunk or pot to pull it into place.

Rosade then chooses a shallow bonsai tray with a depth of one to two times the diameter of the trunk at its base, and a length of about two-thirds the height of the tree. He covers the tray's drainage holes with small squares of nylon screening, then runs a wire down through one hole and up through another, leaving enough wire so that it can be tied over the root ball to hold the plant in place.

To bring the root system into balance with the much-reduced foliage, he removes as much as two-thirds of the soil and roots from the bottom, snipping off the heaviest roots so they will fit the limited space. He places the tree in the tray—usually off-center to balance its asymmetrical mass—on a layer of gravelly, quick-draining soil, then ties the wires over the root ball and fills in with finer soil.

The finished bonsai is then soaked for about ten minutes in a tray of water to which a commercial root stimulant containing vitamin B1 is added. To allow the tree to recover from its operation, it is set in a protected spot out of the sun and wind for a week, then gradually moved into full sun, where it will have to be watered an average of once a day. After a month, Rosade starts feeding his new bonsai a balanced liquid fertilizer in solution, applying it every two weeks until mid-October, when the plant slows down for a winter rest and will not require feeding until the following spring. At about the same time, when the training wires have had time to do their job, he removes them before they get embedded in the growing bark.

When freezing weather becomes likely, Rosade

This miniature landscape, in the Chinese *penjing* style, is on permanent display at the National Arboretum.

Ogden Tanner wrote about orchids in SMITHSONIAN, *November 1985. His book* Gardening America *will be published by Viking Studio Books in February.*

Using a crowbar and tire iron, Dan Robinson and Larry Jackel struggle to free stunted ponderosa pine.

places the new bonsai—along with all the others in his considerable collection—in an enclosed, unheated area where it will remain cool and dormant, yet protected from severe temperatures and drying winter winds.

To maintain at a height of four feet or less a tree that would ordinarily grow to 50-100 feet may require creativity and patience, but it does not involve torture, horticulturists are quick to point out; plants have no central nervous system and thus cannot sense pain. Nor is it a question of starvation, which would soon sicken and kill the plant. A well-cared-for bonsai, in fact, gets ample water and nutrients—and is protected from the vicissitudes of nature, including insects and disease—with the result that it usually lives much longer than its cousins in the wild.

The main thing that keeps a bonsai small is careful pruning: reducing the total amount of its leaves and roots so that it simply cannot manufacture enough food to become any larger. Terminal buds at the tops of branches are constantly cut or pinched off, stimulating the plant to redirect energy to lower buds; these form shorter, lateral shoots and smaller leaves that give the plant a compact, bushier look. To keep top and bottom growth in healthy balance, a plant is periodically removed from its pot. Long thick roots are trimmed back, encouraging the growth of fine new feeder roots, and the plant is repotted in fresh soil.

Though its history is not precisely documented, the idea behind bonsai seems to have originated not in Japan but during the Han dynasty in China some 2,000 years ago, when artists began to fashion miniature landscapes in trays, and to grow flowers and small trees in pots. Buddhist monks brought examples of bonsai with them to Japan in the 12th century, believing that they were sacred objects—"verdant stairways to Heaven"—that expressed a connection between God and mankind. At first the sole property of the samurai aristocracy, the notion gradually spread to the middle classes, becoming a widely accepted art form by the 1800s. It was first introduced in the West at an exposition in Paris in 1878, and later at an exhibition in London in 1909, where the curious little trees created a sensation.

Bonsai made its first appearance in the United States early in this century when Lars Anderson, Ambassador to Japan, brought home an impressive collection that was eventually donated to the Arnold Arboretum in

Hugging a root mass in a burlap sack, Jackel carries 700-year-old juniper from its home on Wyoming range.

Mission completed, Robinson heads across Colorado prairie with load. In nine days, his haul was 40 trees.

Boston; along with others, his trees can still be seen there. Actual training of trees in this country, however, was confined to a handful of Japanese-Americans living on the West Coast. The real flowering of popular interest dates only from the years following World War II, when American servicemen who had been stationed in Japan brought back their discovery of bonsai.

Most bonsai today are based on five main styles codified by the Japanese—formal upright, curved trunk (the most common), slanting, cascade and what is called "literati," with a slender trunk and fewer branches—as well as variations with windswept or twisted trunks, trees grown in or over rocks, and multi-stemmed and group "forest" plantings, totaling more than 30 versions in all. While the majority of standard bonsai trees are from one to four feet tall, many enthusiasts also try their hand at *shohin*, a kind of minibonsai using plants six inches high or less; or *shito*, featuring specimens that are barely three inches high, planted in pots not much bigger than a thimble, with a teaspoon of soil. While such dollhouse editions carry miniaturization to a fascinating extreme, they are even more demanding; they must be watered faithfully—as often as five or six times a day—and are often fertilized with a hypodermic syringe.

Growing in popularity, too, is another variant of bonsai called *saikei*, or "living landscape," which combines plants, rocks, mosses, tiny ferns, grasses and sand or fine gravel to create entire seashore, woodland or mountain scenes in realistic miniature. Finally, there is the allied art of *suiseki*, or "viewing stones," which uses no plants at all; it consists solely of individual rocks collected for their evocative shapes and patterns, and displayed as art objects in themselves.

In judging a bonsai, a connoisseur looks first for overall artistic effect. Paramount is a choice of style appropriate to the nature of the tree—one doesn't try to force an upright-growing redwood into a drooping cascade form, which is better suited to an old, gnarled pine clinging to a rocky mountainside. "A bonsai should never be trained into a shape that does not naturally become its species," says Yuji Yoshimura of Westchester County, New York, one of the first Japanese masters to teach bonsai to Americans, in the 1950s. "It should remain a forest tree, seen through the wrong end of a telescope."

Text continues on page 148

Chinese quince (*karin*) with a triple trunk is 100 years old. In this winter setting, the tree's leaves have fallen, but fruit hangs on—it is one-third normal size and edible.

The *chirimen-kazura*, which has been growing onto this rock for 80 years, has been trained to harmonize with the rock's special qualities.

Cascading Indian evergreen takes its name (*bushukan*) from its unique fruit, which is thought to resemble the "hand of the Buddha."

Japanese cedar (*sugi*) is distinguished by its tall parent trunk. The leaves turn red in autumn.

A Japanese zelkova, in full color of autumn, stands 28 inches high. When removed from garden 20 years ago, it had branches nine feet long.

Here, in winter season, the zelkova has lost its foliage and is thought to resemble a broom; for this reason, its Japanese name is *keyaki.*

Japanese *ume*, an apricot-plum tree, is especially appealing as bonsai because of delicate flowers and profusion of branches. Deeply marked trunk indicates a venerable age; tree is thought to be 120 years old.

Granddaddy of the National Arboretum collection, this Japanese white pine was in single family for 350 years before they donated it to American people for U.S. Bicentennial; it stands at end of the exhibit.

While a presentable bonsai can be made out of an ordinary juniper bought for $5 at the neighborhood nursery—a favorite practice plant for beginners—outstanding older specimens shaped by skilled artists can command impressive prices, ranging up to $2,000 and occasionally as high as $25,000 (a fine container can be worth many thousands by itself). In Japan, where leading executives like the chairman of Honda Limited dabble in bonsai much as wealthy Americans do in art or racehorses, it is not unusual for an ancient tree of exceptional artistry to go for the equivalent of $200,000-300,000, and some have fetched more than $1 million. To protect such an investment, a wise collector generally leaves its care and feeding to a professional bonsai trainer, and has his prize delivered from the nursery only on special occasions so it can be admired by guests at his corporate headquarters or his home.

While Japanese styles and species remain classic standards for bonsai, in recent years a more Americanized version of the art has begun to emerge. Traditionally, bonsai makes use of temperate-region plants native to the latitudes of Japan, particularly slow-growing, long-lived ones like junipers and pines, as well as deciduous ones like Japanese maples, gingkos and zelkovas. Almost all must be grown outdoors; they are brought inside to be enjoyed for only a day or two at a time (a fact that novices learn the hard way when they try to keep a new prize inside permanently, on a coffee table in a room with too much heat and not enough light).

Americans, with well-heated homes and an affinity for houseplants, are increasingly broadening the field by using subtropical and tropical species that not only have their own distinctive appeal but thrive indoors in winter in the North. Species lending themselves to such use range from figs and English ivy to gardenias, camellias, bougainvilleas, acacias and bamboos, though care must be taken to provide particular species with the temperature, humidity and light levels they require.

Americans tend to be freer and more experimental

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in the way they style and train plants, using distinctive, native North American species, like Florida buttonwood and California juniper—so beautifully twisted by nature that they draw raves from bonsai masters in Japan—as well as others with special character, such as ponderosa pine, redwood, bald cypress, American hornbeam and larch.

The finest of such trees are usually collected in the wild. Already old and well-shaped by the elements, a prize trophy often has the potential of becoming "instant bonsai," one that can be brought home and transformed into a masterpiece in a lot less time than a generation or two.

For a true aficionado, collecting can be the headiest aspect of the art, pursued with all the zeal of a big-game hunter stalking his prey. Some of the best American larches, lovely trees with delicate tufts of needles, come from bogs in Nova Scotia or Michigan, where they are naturally dwarfed by acidic growing conditions and lack of nutrients. Still other sources include old fields or abandoned orchards, where cows have browsed on seedling trees—apples, crabapples, junipers, beeches, elms—constantly pruning them over the years, so that one can find specimens that have gnarled trunks a foot in diameter but are only three feet high. More mundane for the alert collector are nurseries about to throw out imperfect or overgrown stock, which can be cut back and reshaped.

The prudent collector, of course, doesn't just go traipsing onto someone's property to help himself, but gets the owner's permission first. In the case of public property, such as a National Forest or areas administered by the Bureau of Land Management, permission is required by law and must be obtained from the local district office; a fee of $3-5 per tree is usually charged. Off-limits to collectors are National Parks and National Monuments, where no vegetation or wildlife can be removed except in special cases involving scientific research.

Among the most prized of native American species are the twisted pines and junipers found growing in the mountains of the West. There is no more avid collector of them than Dan Robinson, who is also one of America's leading proponents of "freestyle" bonsai, which follows the artist's own rules rather than the classic Japanese ones.

Robinson, a boyish, well-muscled man of 50, with curly hair and a ready smile, alternates 24 hours on duty at the Bremerton Fire Department in Washington State (he often brings a bonsai to the firehouse to work on between alarms) with 48 hours off, which gives him ample time for his own landscape design business and a personal collection of more than 400 bonsai at his rustic lakeside home.

John Naka's bonsai, *Goshin*, at the National Arboretum, has 11 juniper trees representing 11 grandchildren.

In search of stunted trees

On a recent tree-hunting expedition to the Front Range of the Rockies, Robinson (who had been careful to get permission) and two longtime collecting companions—Larry Jackel, a high school physical education teacher from Denver, and Felix Laughlin, a Washington, D.C. lawyer—bumped over dirt roads in Robinson's pickup, scanning the foothills for outcroppings with crevices in which stunted pines and junipers are apt to grow. Each time they spotted a likely site, the excited hunters piled out of the truck and clambered after their quarry with crowbar, sledge, saw and long-handled pruning shears, along with a small hydraulic jack to wedge the rocks apart.

Digging, prying, severing unwanted roots and branches, they were able to get an easy specimen out of its stronghold in half an hour or so—harder ones took up to half a day—wrapping the roots in burlap to prevent drying, and lugging their prize back to the truck and its trailer. If a particularly handsome tree proved difficult to move without endangering it, they excavated the part of the roots they could reach, and wrapped them in sphagnum moss and black plastic to

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encourage further growth. Then they noted the spot so they could return next year to cut the tree loose safely from its still-buried roots and bring it out. The expedition was fruitful: after nine days, the pickup and trailer had been crammed with multiple loads for each collector, including 40 specimens that Robinson hauled home to Washington.

Robinson, who is considered somewhat of a maverick by conventional bonsai fans—and on the leading edge of the art by others here and in Japan—creates compositions that reveal a deep respect for the nature of trees and are distinguished by an extraordinary sculptural energy. "Bonsai should be fun," he says. "I'd rather do a 'Wow!' bonsai, an American kind of bonsai, than a safe one that reverently follows Oriental traditions." He puts primary emphasis on the trunk of a tree, particularly the deadwood valued by many bonsai artists, which he often carves and hollows out. To create new foliage on the deadwood, Robinson implants a juniper whip in a groove cut along the length of the trunk, burying the juniper roots in the soil. When working with a live bark strip of a trunk, he simply grafts new growth directly onto the live part. One of his trees, a 160-year-old ponderosa pine, stands in a place of honor at the National Arboretum in Washington, D.C. He calls the tree, which has a stout but whimsically graceful look, "Jackie Gleason Dancing."

Also at the arboretum are the many trees of the National Bonsai and Penjing Museum, which has become a mecca for bonsai lovers in the United States. The main display, reached through a charming Japanese garden, is of 53 outstanding bonsai presented by the Nippon Bonsai Association of Japan to the American people for the U.S. Bicentennial in 1976. At the entrance to the exhibition stands a 190-year-old Japanese red pine donated by the Imperial Household; at the end is the granddaddy of the collection (p. 148), a Japanese white pine more than 350 years old, given by a family that had passed it down through many generations. (When its donor was invited to visit his gift in its new home, notes curator Bob Drechsler, he stood before it for a long time with tears in his eyes.) Nearby are 31 *penjing*, Chinese versions of bonsai, donated by Yee-sun Wu, a Hong Kong businessman. To complete the picture and update the history of the art, the National Bonsai Foundation is raising funds from private donors toward a new American pavilion, which will display selections from a hundred outstanding bonsai contributed by North American artists. Reflecting the current diversity in styles and philosophies, the collection will eventually include a wide range of specimens that have a distinctly American look. Construction will soon be under way, with an opening date targeted for fall of next year.

Already on display is the centerpiece of the American collection, given by its creator, John Yoshio Naka of Los Angeles, after whom the new pavilion will be named. A commanding, four-foot-high forest planting of bonsai trees Naka started creating 25 years ago, it is

Bonsai symphony: four ancient juniper trees adorn Washington lakeside; family cat makes counterpoint.

named *Goshin* (Guardian of the Spirit). "Alice and I have 11 grandchildren; *Goshin* has 11 trees," he observes with a smile.

Naka, born in Colorado and educated in Japan before going into the landscaping business on the West Coast after World War II, has probably done more than any other person to spread the understanding of bonsai throughout America and the rest of the world. A small, gentle man of innate modesty, he continues to travel tirelessly at the age of 75, giving lessons to novices and experts alike.

"What I like about bonsai is that it has a beginning but no end," says Naka. "A bud today becomes a branch tomorrow. It is like searching for the rainbow's end; the farther it is pursued, the farther away it is. There are no borders in bonsai. The dove of peace flies to palace as to humble house, to young as old, to rich or poor. So does the spirit of bonsai."

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By Doug Stewart

Doing the dishes: a TV bonanza is up there in orbit

High culture and Soviet soccer, baldness remedies and the Guiding Light *are all there for the taking: beam 'em down, Scotty*

After buying a $2,300 antenna, former coal miner Dennie Sharp treats grandchild Mandy to a matinee.

Dennie Sharp of Mingo, West Virginia, used to work the day shift in a sawmill, the night shift in a coal mine. Ten years ago, with both lungs ready to give out, he decided to retire and take up serious television viewing instead. Unfortunately, like so many of the homes in rural Randolph County, Sharp's house lay at the bottom of a steep, wooded hollow. TV reception was terrible. His antenna pulled in two, sometimes three stations, but barely. If he wanted a tolerable picture, Sharp had to step outside every time he switched channels and haul the antenna from one corner of the yard to another. He eventually dragged his antenna to the top of a 500-foot hill across the road from his house, stringing the wires on locust poles he set himself. His TV picture barely improved, however, and lightning kept blowing out the booster.

During a recent trip through the hill country of West Virginia, I stop to admire the solution to Dennie Sharp's viewing troubles—a $2,300 satellite-TV antenna. The dish-shaped platter of yellowish metal, ten feet in diameter, blossoms from the small yard next to his white frame house, near a large pile of coal and a disabled pickup truck. In the shade under the dish, a roost of plastic chickens has gathered. The antenna picks up the TV signals beamed to Earth directly from broadcast satellites in geostationary orbit (SMITHSONIAN, December 1988) and feeds them to the TV set inside. "You push a button in yonder," Sharp says with a nod toward the house, "and you see this saucer just a-turrrn round. You can watch everything that happens in the world. You can watch high waters and big snows. It's something to see."

Sharp, a stocky, congenial grandfather wearing two flannel shirts, a plaid woodsman's hat and rubber boots, chain-smokes Pall Malls despite all the coal dust in his lungs. He now watches TV, he says, every night until 11 o'clock. "When I first had the dish"—he calls it a "daish"—"everybody from all around would come and stay up all night watching television. Then the next day, they'd go out and get their own dish put up." Indeed, up and down the quiet road running past his house, large satellite dishes stand like sentinels next to almost every driveway, as though sleepy little Mingo were a military installation. Sharp allows that he and his friends and neighbors have had their cultural horizons expanded considerably by satellite television, most particularly by the adult programming their dishes scooped up late at night before such fare was electronically scrambled. "Oh, I learnt me a lot of things," Sharp recalls with a cheerful, wheezy laugh. "I thought I knowed everything in the world, but my God—I seen a lot!"

The satellite-TV dish is revolutionizing American popular culture. For the price of a used car, ordinary American citizens without advanced degrees or elec-

Mike Huffnagel sr., owner of Mike's TV in Mingo, West Virginia, inspects feedhorn of ten-foot satellite dish.

Photographs by Mark S. Wexler

In trailer park in Cherry Grove, West Virginia, dish gathers signals from the 23,300-mile-high satellite belt.

tronic know-how are luxuriating in more than 100 channels of television relayed from space; channels that are raining invisibly down on our backyards and rooftops, day and night. In the old days, TV stations beamed their signals from the tops of skyscrapers or broadcast towers. To transmit the Olympics from Japan or the Beatles from London, however, even a skyscraper wasn't tall enough. The private satellite industry sprang up in the mid-1960s to offer an alternative: orbiting switchboards-for-hire that were soon relaying not only TV shows but also sales meetings, phone calls and computer data. Businesses could rent their own satellite channel for a month, a year or a single event, or they could buy channels outright (like permanent WATS lines).

Communications satellites were perfect for TV. Since they orbited at the same rate that Earth turns, they could serve as invisible broadcast towers that could "see" the whole country. Broadcasters bounced news, sports and other programming off satellites, and local stations around the country equipped themselves with receive-only Earth stations, or satellite dishes, to scoop up the rebounding signals. Today, the satellite that's firing *Guiding Light* down at Dennie Sharp's yellow dish in Mingo every afternoon (a 1,450-pound, 7-by-22-foot can of hardware called Telstar 301) may well be using its other channels to beam down news snippets from CBS and ABC, miscellaneous public service announcements, *Lifestyles of the Rich and Famous* and a string of just-taped sports highlights with a passel of long-distance phone calls to Puerto Rico squeezed in. Home satellite TV may not be as useful, as unexpected or as technically impressive as other types of information that satellites can relay to Earth, but never before has aerospace technology been embraced by the American public with such passion. The home satellite dish is a consumer's hot line to high Earth orbit. With satellite TV, space-age technology has touched down on the patio and the trailer park.

More than two million homes in the United States now have TV dishes, and an inordinate number of these have sprouted in West Virginia. Natives like to say, with either sarcasm or pride, that the satellite dish is the West Virginia state flower. Nowhere have these flowers found more fertile soil than in the hills and hollows of Randolph and Pocahontas counties, a region with some of the worst television reception in the continental United States.

A few miles up the road from Dennie Sharp's house, I stop to watch Mike Huffnagel jr. of Mike's TV install a motor on the back of coal miner Francis Hoover's ten-foot satellite dish. Until now, Hoover has had to hand-crank the dish whenever he wanted to swivel it from one satellite to another. Since satellites are invisible from Earth, I ask how he knew when to stop. "I cut notches in this pipe with a hacksaw, see?" he says. The

Author Doug Stewart, a frequent contributor, doesn't even own a television, but after researching this article, he may purchase the whole works.

Before advent of the backyard antenna, state's many wooded hills and valleys made for terrible reception.

unlabeled notches might strike NASA as a crude way to home in on a spacecraft, but they work.

"One thing about satellite TV," says Mike Huffnagel, giving me his sales pitch as he lifts the motor into place, "the reception is crystal clear. You cannot ask for a better picture." He leans a shoulder into the dish to keep it from swiveling all the way down as he works. Huffnagel recalls the days, seven or eight years back, when satellite dishes were still an exotic species in Randolph County. "People would ask if they'd get zapped by lasers if they got too close, or could I fry eggs in them," he says. Now, in towns such as Elkwater, Slatyfork, Cheat Bridge, Jerryville, Droop and Clover Lick, dishes are simply part of the landscape, like coal trucks and Baptist chapels.

Before the dish brought salvation, perhaps no place in Randolph County suffered more grievously from poor TV reception than did the small town of Job. A tiny dot on the map, Job (pronounced biblically) is completely walled in by steep hillsides as though it were nestled in the crater of a volcano. The houses are small, sometimes shabby, but every one seems to have a dish—wire-mesh dishes, fiberglass dishes, aluminum dishes. I stop in at Teter's Grocery, a combination general store, gas station and informal town hall close by a fast-running creek. Inside, a group of townsmen lounging around a barrel-shaped woodstove fill me in on Job's dark predish days.

"Before the dish, one channel was all you could get," says Tommy Bennett from his folding chair next to the potato chip rack, "and watching that would be just like standing here with the snow a-hard blowing and trying to see that woodpile out there, ain't that right?" Everyone agrees. The only time the picture cleared up, they insist, was when an airplane happened to fly overhead. TV signals zipping by, it seems, would bounce off the plane and into the hollow.

For a while, Job was TV heaven

"When we first got dishes," says Worth Armentrout from his stool by the pinball machine, "you could see anything you wanted to, just hundreds of stations. It was wonderful."

Alas, the suffering of the people of Job was soon to begin anew. The satellite-TV companies began scrambling—broadcasting what looked like video spaghetti. To untangle the spaghetti, a viewer had to pay. No more free movies, no more free sports, no more unlimited viewing pleasure. "We spent thousands of dollars on these dishes," Armentrout grumbles, "and now you've got to buy a damned decoder, and on top of that you've got to subscribe to everything. All that costs almost as much as it did to put in the dish in the first place. What it is, it's just a rip-off." The others agree wholeheartedly.

The philosophy of the TV-dish aficionado, as stated by H. Taylor Howard, the Stanford University electrical engineering professor who rigged up the first home TV dish in 1976, is straightforward: "If it falls on me, it's mine." Taylor acquired his historic antenna as junk from a local telephone company. (Phone companies often use dishes for overland relays in areas where laying cable is too expensive.) "I probably spent $15 for it," says Howard, now also director of research for Chaparral Communications, a satellite-TV equipment maker. "It was all bent up, so I put it on my garage floor and beat it into a parabola."

Howard mounted the 15-foot saucer on a second castoff he'd picked up on the cheap, a World War II radar mount, and aimed it just over the southwestern horizon, where he knew Satcom F1 was hovering. Home Box Office had recently begun using the satellite to bounce movies and special events directly to its customers, which were cable companies scattered across the country. The cable companies were downlinking the programs by dish, then sending them out by cable to their own paying customers, local homes

In Connecticut, the upscale land of plenty, computer consultant Kurt Selchow, a self-styled "communications nut," wasn't satisfied with just the network and cable TV programs. Selchow's neatly landscaped backyard dish brings in hundreds more and he subscribes to 24 scrambled channels—most of which also feature digital stereo sound.

wired into the system. Howard began enjoying HBO's offerings wireless and free of charge. "I wrote them a letter telling them what I'd done and offering to pay the monthly fee," he says, "but I never got an answer." His conscience clear, he sold 6,000 booklets telling other hobbyists how to do what he'd done.

As more and more programmers like HBO took to the skies, the backyard-dish audience grew apace. Within a few years, hundreds of companies were peddling the latest thing in home entertainment, from do-it-yourself kits for less than $1,000 to a $36,500 model from Neiman Marcus. Fed up with what they deemed signal piracy, broadcasters first tried to have home dishes outlawed altogether, then settled for scrambling. Today, most viewers have given in and bought decoders. But as many as half the 1.5 million decoders now in use in the United States are unauthorized "black boxes." Their owners watch all the TV they want and never have to pay. Despite the attentions of a half-dozen federal agencies and hundreds of private investigators, shadowy electronics shops continue to do a brisk trade in illegal decoders. One of the largest busts occurred at an Indian reservation in Montana this year, where a small but industrious group was carrying out a nationwide, $856,000-a-year business ($650 for a new one, $300 for custom alterations).

Like most Americans, dish owners appreciate a bargain, yet the runaway popularity of black boxes suggests something more about dish owners: that most believe they have an inalienable right to television from space. This notion is widespread in rural outposts like Job and Mingo, where satellite TV is a lifeline to the outside world but where paying monthly bills to get it is an extravagance. (Plenty of satellite TV remains free for the taking, of course, but once you've visited TV heaven, it's hard to settle for less.)

In many communities around the United States, however, the TV dish is more a high-tech toy for the television connoisseur than it is a survival tool for the cultural shut-in. Kurt Selchow, a computer consultant in prosperous Litchfield County, Connecticut, for example, doesn't really need his dish to pull in great TV. The streets of his town are wired for cable TV, should he choose to tie in. And by swiveling a conventional antenna on his rooftop by remote control, he has occasionally pulled in four Channel 6's alone. But for the 46-year-old former shortwave-radio buff, four Channel 6's are not enough.

Selchow's description of himself as "sort of a communications nut" is an understatement, I realize, when I stop in to visit him one afternoon. The modest ranch house he shares with his wife contains six TV sets (down from eight before a recent yard sale); two of the sets run on batteries in case of a blackout. "We don't want to be too far away from a TV if something earthshaking happens," he says. The centerpiece of Selchow's home-viewing facility is an 800-pound saucer resting on a sturdy tripod at the edge of the woods behind his house. The 12-foot fiberglass device has been painted a dull gray-green in an unsuccessful attempt to make it blend in with the trees behind it.

"The signals come down from space, bounce off the dish and up into the opening in the feedhorn here, where they're collected," Selchow tells me as we stand

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among the rhododendrons and dwarf spruce underneath the dish, another vain attempt at camouflage. A TV signal from a satellite, he explains, is weak to start with (about as powerful as a flashlight beam), yet by the time it hits Earth the signal has dispersed over millions of square miles. "There isn't much signal left after coming all that distance," he says. "That's why you need a big dish." Already, a few satellites are transmitting at higher frequencies and more wattage, letting some TV viewers use dishes only three or four feet across. A full-scale switch to smaller dishes is unlikely anytime soon because, for one thing, the higher-frequency signals can be broken up by raindrops, a shortcoming that small-dish owners have found irksome. For the time being, most TV dishes in this country will remain serious pieces of lawn furniture.

We retire to Selchow's primary viewing station, a couch in his basement den. The room is outfitted with a 25-inch color television set that has a pair of large stereo speakers on either side, a stack of video components and, on the wall behind us, a chart listing 21 broadcast satellites and the TV channels each transmits. Selchow never looks at it, however. He appears to have the whole chart memorized.

"Out of the 24 channels on the satellite Galaxy 1," he says, "18 are scrambled. I subscribe to all of the scrambled ones. Most of these, by the way, have digital stereo sound." Selchow speaks rapidly and a little breathlessly, especially when the subject is satellite TV. He seems as excited about his dish as he must have been the night it was installed, seven years ago, when he stayed up most of that night swiveling it from satellite to satellite until it overheated. He punches buttons in a little computer console, which selects channels from the satellite, and I see snatches of movies from HBO, Showtime and other cable-TV mainstays. Occasionally, he hits more buttons on a different box and the dish outside slowly sweeps up to other satellites along the equatorial broadcast belt. "This is called Movie Time. It's nothing but 24 hours a day of movie previews," he says, cracking open a beer. "This is called the Z Channel [now defunct]. They show basically cult movies—*Death of the Zombies* and that sort of thing." We watch a nun and a cowboy talking to a Hindu holy man on a mountaintop.

"Ooh, this is one of a kind—American Exxxtasy." The station is showing a preview for an X-rated film. An announcer intones: "Operators are on duty to authorize you in seconds." The full-length film will be broadcast in scrambled form later this evening, Selchow says. If he calls up to subscribe, the broadcaster will beam a special authorizing signal—via satellite—directly to his decoder. Selchow is unmoved by the sales spiel, though he chuckles at its tackiness.

Next we witness a live news feed from Canada. Feeds are station-to-station hookups not intended for the home viewer. A cocky, young anchorman in a well-tailored suit sits at his news desk, fidgeting self-consciously as he waits to go on the air. He tells someone out of camera range, "Do you know what she said about me? She said, 'Oh, he's so pretty. I bet he's a dirty old man.'" The camera is rolling, the signal sent spaceward so that when it's time to go live, the station can be sure everything is plugged in and working.

In Birmingham, Alabama, a Franciscan nun, who had just $200 in the bank and some generous corporate support, bought an uplink dish and started the Eternal Word Television Network (EWTN). From the station's control room, a technician punches up an image of the animated, brown-habited TV star on set of her talk show, *Mother Angelica Live.*

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Creighton University professor Lee Lubbers poses in his "dish farm," source of the campus' 30-channel cable TV system. From his Omaha location, he downlinks Soviet shows and other foreign broadcasts.

After five hours, I'm hooked. I've seen a channel that shows live sports from Chicago at night, and half-hour commercials for food slicers and baldness remedies during the day. I've watched a preacher with the belligerent manner of a professional wrestler as he lists the attributes of the Antichrist on a blackboard so I'll know him when I see him. I've watched a station that broadcasts country-music videos 24 hours a day, and another that updated me on the closing prices of barley in Winnipeg. Yet for all that, I feel I've only begun to sample all the weird signals that Selchow's big green dish is scooping up and stuffing into its feedhorn for our edification and amusement.

The experience convinces me that it doesn't take much to take your message to the skies. With satellite dishes, the link between studio and audience can be far more intimate and specialized than in the glory days of network television. For a few hundred thousand dollars, anyone with the right permits can set up a satellite-TV network and pipe his message out to dish country over his very own channel.

Some networks start out with less than that. Mother Angelica, a Franciscan nun in Birmingham, Alabama, had $200 in the bank when she decided to start the Eternal Word Television Network (EWTN). Relying on small donations, occasional foundation grants and the generosity of corporate angels, as it were, she began beaming up four hours a day of religious programming in 1981, with reruns of *Lassie* and other wholesome fare to fill out the schedule. Today, EWTN is a 24-hour-a-day operation, complete with two mobile trucks (Gabriel I and Gabriel II).

"When the Holy Father came to this country two years ago, we uplinked him from 9 in the morning until midnight," Mother Angelica tells me matter-of-factly when I visit the EWTN studios adjoining Our Lady of the Angels Monastery. Mother, as everyone calls her, is an animated, blunt-talking figure in a voluminous brown habit who quickly dispels any suspicions I may have that she's only a figurehead. Sitting in a huge leather armchair behind an executive desk in her office, she punches buttons on her phone console continually, dispatching her callers with a few brisk orders. She's given to expressions like "go hang" and

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By Lubbers' cluttered desk in his office, four TV sets show programs from Canada, France and the USSR.

"yucko," and observes of a former business associate, "The guy ripped me off, boy. He charged me $1,000 to make a three-quarter-inch videotape!"

Eternal Word's broadcast schedule includes documentaries, live church services, children's shows and Christian music. Mother herself is the network's star. She hosts a talk show called *Mother Angelica Live* with call-ins from viewers. On TV, she comes across as part stern confessor, part grandmother, but her on-air persona developed only with practice. She recalls the first time she stepped before a TV camera: "It was disaster, honey. I looked like Grandma Moses with a Mickey Mouse voice." I ask her what she did with the videotape. "I didn't have the humility to keep it," she says, noting that her list for confession has grown considerably since she became a broadcast executive.

Mother concedes that a cloistered nun who has lived behind the walls of a monastery for 45 years and counting, and who still spends four or five hours a day in prayer, is an unlikely TV personality, but she feels that satellite TV is the most efficient tool she can use to reach the public with her message of spiritual uplift. "People don't read anymore—you know that," she says. If her Christian duty is to "spread the good news," as she says, what better instrument is there than a satellite dish? She's aware that some disdain TV dishes as eyesores. She walks around her desk and gazes out the window at EWTN's enormous uplink dish, a pristine white bowl 33 feet across that fires a continuous stream of programming up at Galaxy 3. "To me," she says, "they're not eyesores. They're modern angels."

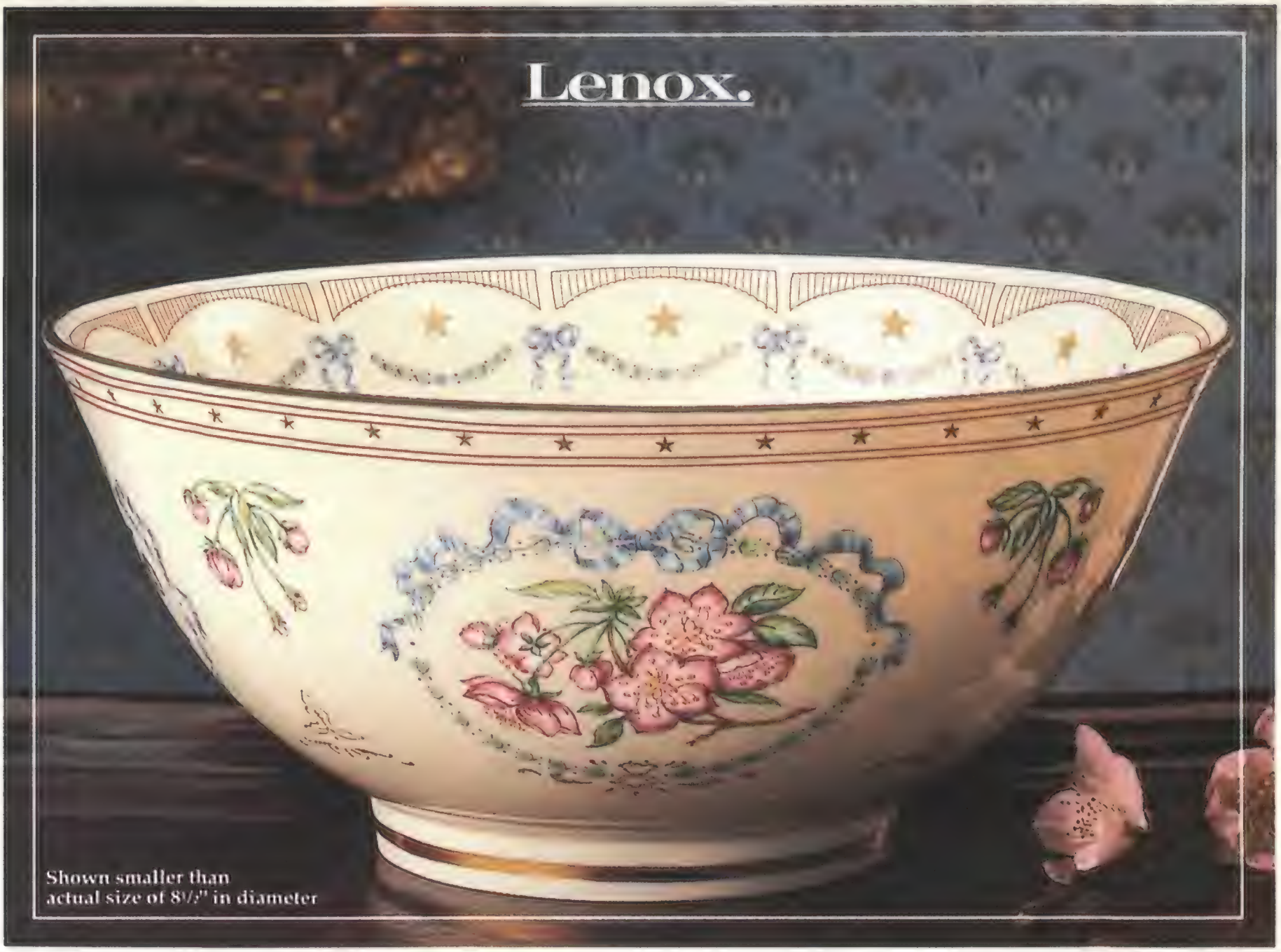
Would that the rest of the country were as enlightened. Battles over TV-dish emplacements have become a staple of courtroom and zoning-board agendas coast to coast. At least one town tried to classify backyard dishes as billboards and prohibit them accordingly. Three years ago, the Federal Communications Commission had to step in and rule that TV dishes couldn't be unreasonably regulated or discriminated against. All the same, in many an upscale suburb, dishes keep a low profile. Some homeowners hide their dishes in the woods and trim just enough branches to maintain a slot to the equatorial satellite belt. In the private resort of Coral Springs, Florida, where woods are scarce, the architectural control committee has decreed that residents confine their dishes to screened-in enclosures (suggested color: dark bronze) surrounded by appropriate foliage.

On the campus of Creighton University in Omaha, by contrast, satellite dishes are clearly an honored species. When I arrive at the campus, I'm greeted by a defiant profusion of antennas crowding the rooftop of a maintenance garage, while in a parking lot next to it a clump of bigger dishes points silently skyward. The man presiding over this diverse dishdom is a 61-year-old sculpture professor named Lee Lubbers. Lubbers regards satellite antennas as functional art for the Information Age. For him, the dishes are all on hand to bring in satellite television from around the world.

Tuning in is almost a biological imperative

Like Kurt Selchow, Lubbers seems perpetually thrilled by the chaos of unseen video signals zipping down from the sky. Tuning in to all this free information is, to both of them, close to a biological imperative. But where Selchow is content with a single dish, Lubbers, a jolly, disorganized man with an easygoing manner and a direct, blue-eyed gaze, is tied in to a worldwide network of some 40-odd satellite dishes. "We get TV from Japan, the Soviet Union, Zimbabwe, Turkey, China and maybe a dozen other countries," he says. On a bank of TV monitors in a control room, I watch a dizzying succession of unedited scenes from overseas: a group of men wearing turbans shake their fists in unison; a woman manipulates an abacus in a Chinese police station as a group of officers watch her delightedly; a pair of shoppers stroll through a mall and sing to each other in French.

Lubbers began cultivating his "dish farm" as a source of TV for the campus' 30-channel cable-TV system about seven years ago with three homemade dishes. As the antennas proliferated, Lubbers set up an educational TV network called SCOLA, or Satellite Communications for Learning. Of the dozens of satellite dishes that SCOLA now uses, 18 are here at Creighton. Some of the other dishes gather news broadcasts



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from foreign satellites and relay them, by more satellites, to Omaha. Here the live newscasts and other foreign broadcasts on tape are spliced into an untranslated, eight-hour-a-day medley. A big uplink dish shoots the programming up into space a third time. To complete the trip, SCOLA's subscribers aim their own dishes at Telstar 303, perched high above the Pacific to pull in this polyglot's dream. Most of the subscribers are university language departments, but personnel at the U.S. Defense Department and the CIA also tune in.

Lubbers leads me up onto the antenna-covered roof of the maintenance garage, where we wander in the shade like ants beneath a crop of giant toadstools. "I'd say 60 percent of the people on campus who had opinions about such things thought this was a junkyard at first," he says. Lubbers, who used to build sculptures out of discarded garbage disposals and washing machines (with working plumbing), thought otherwise. The first dish he ever bought was, to be sure, something that probably only a junk sculptor could love: a do-it-yourself kit made out of a wooden frame and galvanized window screen that he purchased for $400 back in 1980. He still has it. He points out what I had taken to be an old, wooden bed frame that someone had tossed off the garage roof. Weeds have begun growing up the window screen, but Lubbers says that it can still pull in a signal from six satellites without moving, thanks to an adjustable feedhorn.

Lubbers' office, a disheveled room squeezed into one end of a house trailer, contains two computer screens and four television sets; all six are on. Visible atop the various piles of books and video gear are a street map of Beijing, a Russian phrase book, an audio cassette called *Polish for Travelers,* a globe and a copy of *Walden.* "With satellite dishes, you can wallow in information," Lubbers tells me a trifle unnecessarily as he rocks back in his chair amid the stacks, a remote-control box in one hand. He hits a button, and a French rock'n'roll trio in shiny décolletage is replaced by mournful-looking Siberian peasants huddled in a log cabin. Twenty years ago, he muses, no one would have imagined that the Tractors and the Dynamos, two Soviet soccer clubs, would have a small but loyal following in eastern Nebraska.

For 65-year-old Mother Angelica, whose Christian duty is to "spread the good news," the satellite-TV dish is a godsend. While some people disdain dishes as eyesores, "to me," she says, "they are modern angels."

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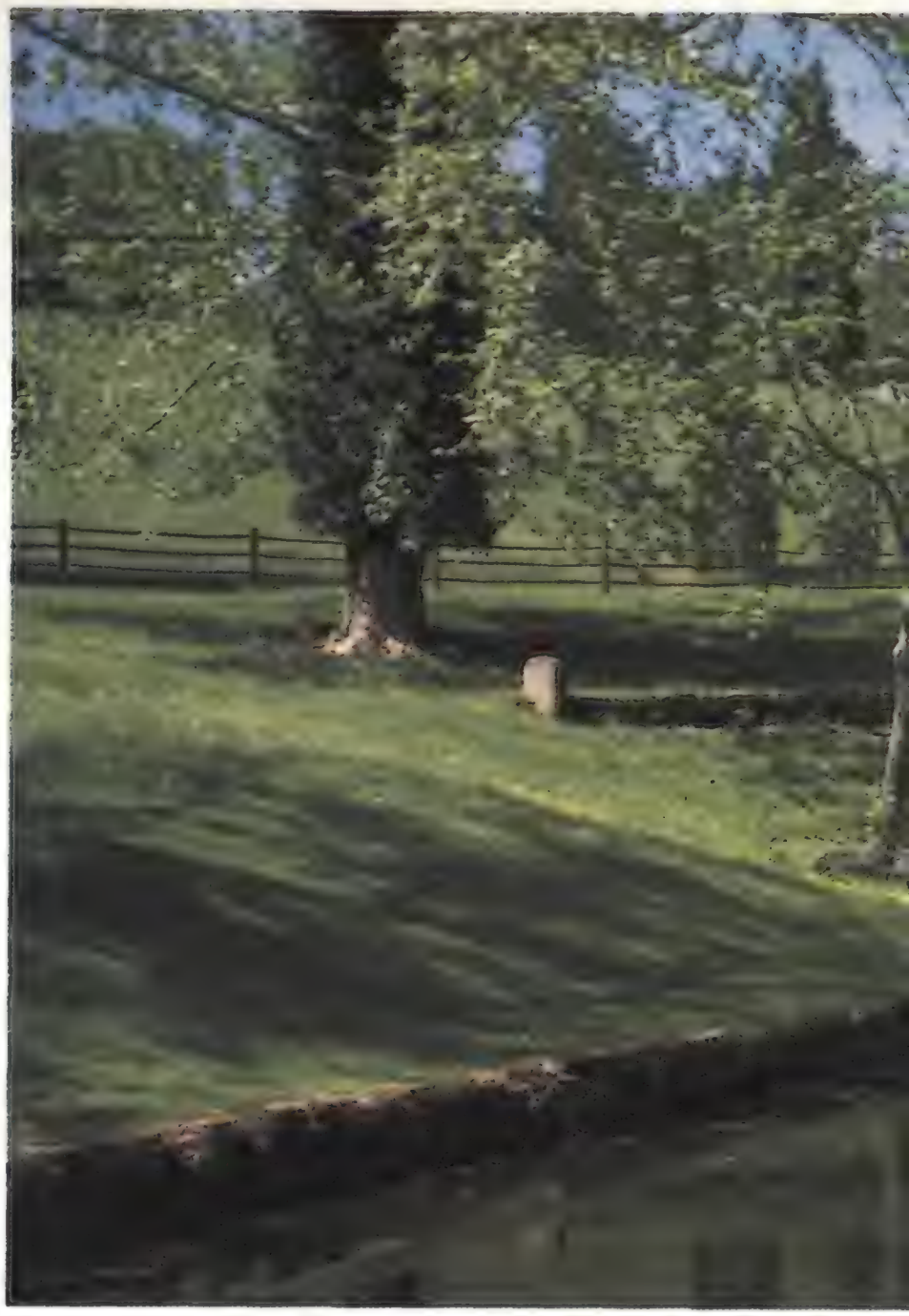
By Roger G. Kennedy

A young nation builds its temples to the future

From the Hudson River to Puget Sound, Americans set a distinctive, exuberant stamp on an architecture inspired by Athens



Temperance Temple at Bremo, a Virginia estate, adds sobriety to the lexicon of classical virtues.

Architecture is always a public utterance, but seldom has that utterance been as explicitly political and as popular as it was in America's first national architecture, the Greek Revival.

In the three decades before the Civil War, Americans, filled with pride at having conquered a continent, looked to ancient Greece for their inspiration. Little temples sprang up all across the settled regions of the nation. Everyman tried his hand at columns, pilasters, triglyphs and guttae, laurel wreaths and a system of ornament drawn from lotuses and acanthuses, Hellenized tobacco leaves and corncobs. The Greek, and the Greekish, appeared in villages from Bangor to Tallahassee, from Luray, Virginia, to Sacramento.

The architectural precedents sprang both from Greece and Rome, but Americans associated their experiment in republicanism with Greece—civilized, orderly, democratic—rather than imperial Rome, and thus it was fashionable to speak of a "Greek" rather than a "Roman" revival.

It did not last long—only 30-odd years—but its works, many of them anyway, remain with us. Some 3,000 important Greek Revival buildings still stand today. As the pictures here and on the following pages attest, they are poignant reminders of a new country's aspirations.

The infatuation with all things Greek was manifested in many forms. For a time in the 1820s it had seemed as if the United States might actually go to war to aid the Greek rebellion; an early draft of the Monroe Doctrine extended the reach of American sympathy, at the least, to the Greeks. John Adams had spoken of building a "Christian Sparta" and now a score of places aspired to be the "Athens of the West"—Philadelphia, Cincinnati and Lexington, Kentucky, among them. Squalid frontier villages elevated themselves to Attic grandeur: from Athens on the Hudson River to Athens, Ohio, and Athens, Georgia; from Corinth, Mississippi, to Corinth, New York; from Sparta, Georgia, to Sparta, Wisconsin.

Greek Revival architecture was a political statement, though not in the narrow sense of a party preference. Americans set themselves up in glistening white houses whose forms came from structures used by the ancient Greeks only as shrines to their gods and heroes. These "templed hills" asserted that each risen yeoman might be a hero, that all citizens could aspire to a kind of grandeur.

It was an architecture of dominance, or conquest, and reordering. Chimerical courthouses were mapped upon neat grids of imaginary cities-to-come. Where there were only forest and swamp, the map read "court-

It was built in the turbulent 1840s, when a national campaign against "demon rum" was gaining force.

Fluted columns adorn Philadelphia's Second National Bank, America's first Greek Revival public building.

house square," and the "courthouse" was shown as a rectangle bounded by dots to imply columns upon a platform of stone, raised above the turmoil of commerce and the squabbles of mankind.

In the same way, a "more perfect Union" had been created, a system of government channeling private energies toward the common good. Its checks and balances would offer new syntheses, a stately symmetry of perfectibility. The Northwest Ordinances marked out across an inland empire arbitrary rectangles, townships and sections, projecting schools and villages upon them.

The American Greek Revival, like the first American Union, died with the Civil War. Ruined columns, smoke-blackened temples, burned-out hulks of courthouses and temple-residences gave evidence after Appomattox that the dream of order had collapsed.

The director of Smithsonian's National Museum of American History adapted this article from his book Greek Revival America *(Stewart, Tabori & Chang).*

War is disorder; the Greek Revival, with its solemn rectilinear precincts, bounded by the emphasis of columns, had proclaimed that rational Americans might solve their problems otherwise. American politics had failed—civil violence is the admission of political failure. The Greek Revival was nationalist, and the Union had fallen apart. It had implied a special nobility for American ideals, in the face of the condemnation by civilized peoples of the most ignoble of American realities—the persistence of slavery. When order collapsed into bloodshed, it was impossible to reuse the same symbols.

After Appomattox, Americans borrowed their architectural forms from others: Napoleonic mansard roofs, Queen Annities, Swiss chalets and Italianate neo-Renaissance pastiches. Finally, at the end of the century, America regained its nerve, with Henry H. Richardson, Louis Sullivan and Frank Lloyd Wright, but never again would there be a national architecture—widely popular, intensely ideological and intensely proud—as there was in Greek Revival America.

Photographs by Robert C. Lautman

Remodelers added shingled siding to Universalist Church, built in 1837 in Montgomery, Ohio.

Philadelphia's Waterworks, 1822, and the massive Academy of Art, built in the late 19th century, are hallmarks of the country's most extensive Greek Revival complex. Similar acropolitan monuments at one time dominated many antebellum American cities.

Row of columns (below) demarcates apse of Tabb Street Presbyterian Church in Petersburg, Virginia.

Commissioned to build a temple not to the gods but to commerce, William Strickland designed the Merchants Exchange in Philadelphia. He used sources ranging from a neoclassical British church to an Athenian monument to a singer.

Ironwork filigree on Bangor, Maine, "Birdcage House" adds whimsical embellishment to an austere facade.

In Granville, Ohio, the Avery-Downer House (above), a Greek Revival jewel inside and out, is a museum.

Newly restored Asheville, New York, home exemplifies high-spirited beauty of America's classical revival.

Greg Osby has a "work station" at home where he can hook up saxophone to computer and synthesizer.

Notes he blows on his sax become digital signals that generate computer score and play synthesizer keys.

By Errol T. Louis

Jazz makes a new sound with soul, pop and computers

A Brooklyn collective of young musical upstarts finds inspiration in anything from bebop to kung fu movies and Motown

Steve Coleman, rehearsing for concert at Brooklyn Academy of Music, says that he is "playing life."

A few years ago, while still in his early 20s, saxophonist Greg Osby had a job that many older musicians would kill for. Playing in the band of an established jazz trumpeter, Osby had exposure, steady work, international travel, decent pay and an impeccable credential to add to his musical résumé. But Osby felt cramped; he would play jazz "standards" in public—many of them songs first written and played in the 1930s and '40s—and then go home to practice his own, very different musical ideas.

Finally, Osby began to express his own style in performances, especially during solos—that moment in jazz when a player takes the spotlight and improvises variations on a song. The reaction from audiences was the worst possible—bewildered silence. "It turned a lot of people off. They thought I had lost my mind," he says. "I would never get any applause."

Osby actually got off easy, compared with some of his predecessors. More than 30 years ago, the story goes, another young saxophonist—Ornette Coleman from Texas—was trying out *his* new ideas about melody and harmony while playing at a dance. At one point he cut loose with what was later described as a "probably incomprehensible" solo and the patrons stopped dancing in their tracks, utterly aghast. Later, one of them lured Coleman outside, where annoyed partygoers were waiting; they beat him up and flung his horn off the side of a hill.

Luckily, Osby never got beat up, but he did end up leaving the well-paying job to become part of the tradition of jazz innovation. This process, in many ways an ongoing insurrection, is in the nature of the music.

Jazz musicians pack a lifetime of observations and experiences into the split-second spontaneity of the improvised solo. Younger musicians, who see things differently from their predecessors, naturally tend to create new styles that may sound odd or even ugly to older ears.

The classic case occurred in the 1940s, when a group of young, New York-based musicians created a demonically fast, jagged style of playing called bebop. It was hard to play and harder to dance to, but bebop seemed to capture the quick, clashing pace of life in the cities of postwar America. The jazz world was overwhelmed by bebop musicians like pianists Bud Powell and Thelonious Monk; drummers Max Roach and Kenny Clarke; trumpeters John (Dizzy) Gillespie and Miles Davis; and saxophonist Charlie Parker.

The new music wasn't immediately accepted. Louis Armstrong—by any definition a pivotal figure in American music and a father of jazz—once described the frantic bebop sound as "modern malice." Another jazz great, Cab Calloway, called it "Chinese music." The beboppers, in turn, derisively referred to their hostile elders as "moldy figs."

In the late 1950s and into the '60s, another gathering of innovations exploded into "free," or avant-garde, jazz, with saxophonist John Coltrane and pianist Cecil Taylor, among others, developing music in which harmony and melody were used with little or no regard

Photographs by Jonathan Atkin

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Forerunners of M-BASE as innovative jazz musicians are (clockwise from top left) trumpeter Dizzy Gillespie, pianist Thelonious Monk, saxophonist Charlie (Bird) Parker with trumpeter Miles Davis (who pioneered a cooler sound), and saxophonist Ornette Coleman.

for anything resembling familiar song forms. Ornette Coleman, no longer physically ambushed for this kind of playing, once brought seven other musicians into a studio, gave each man a few notes to play, and they all improvised around them for the entire length of a record.

Free jazz reflected the loosening of cultural boundaries that marked America in the 1960s. At first the musicians were attacked: Coleman, Coltrane and their contemporaries were accused of simply making noise, "anti-jazz" in the words of one critic.

A rebellious stance has always been part of the jazz tradition. Sometimes, the rebellion has simply been a kind of evolution. In New Orleans, the traditional jazz, or "ragtime," marching bands that paraded down a street were inevitably accompanied by a loose collection of young followers, who would dance along the sidewalk, keeping pace with the main group of musicians, known as the First Line. Although the scene might have looked chaotic to an outsider, there was a definite hierarchy in place, according to music historian Albert Murray. Many of the young stragglers were actually musicians in training—the Second Line. As apprentices, they were expected to listen and learn, and to

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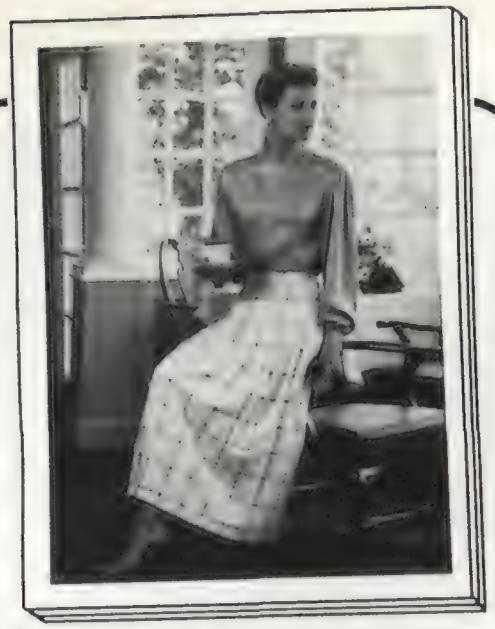

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carry the older musicians' cases; eventually, Second Line players were occasionally allowed to substitute for the First Line in funerals and other parades. The displacement of older musicians, although inevitable, was graceful and gradual.

And at times, the rebellion has been painfully ironic. As a youngster in the 1930s, Charlie Parker used to sneak into Kansas City nightclubs to listen to the reigning colossus, Lester Young. Not long after, Parker was to eclipse Young's fame with fleet, dazzling extensions of the older man's smooth, melodic style—the fluttering improvisations that matched Parker's nickname, Bird. At one point toward the end of Young's life, after drastic career reversals that included time in an Army prison, the old lion, his popularity in decline, ended up in a small hotel room in New York City. There he would stare across the street at the neon lights of the city's hottest jazz club, named Birdland in honor of his former fan and successor as saxophone king.

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New York City, a handful of young musicians like Osby have banded together in something called M-BASE, which stands for Macro-Basic Array of Structured Extemporizations. The name (pronounced "em-base") sounds more like a computer program than an arts collective, which is fitting: several players make extensive use of computers and electronic synthesizers in their music.

Although "array of structured extemporizations" is a mouthful, it's really another way of referring to the interaction that goes on between musical structures and improvisations on them—which is probably as accurate a definition of jazz as any other. When all is said and done, M-BASE is doing something close to what the beboppers were doing 40 years ago. They are the Second Line of contemporary jazz, about to make a bid for First Line status.

"We're trying to build a common modern musical language," says saxophonist Steve Coleman (no relation to Ornette and, so far, not beat up because of his music). "We're not consciously trying to preserve some style from the past."

The collective is a group of black musicians, mostly in their late 20s or their 30s, mostly clustered in the Brooklyn section of the city. All but a few of them migrated to the jazz capital after growing up in other famous cradles of black American music—St. Louis, Chicago, Mississippi, Detroit. They aren't a band in the ordinary sense of the word, although they pop up in every conceivable combination in concerts as well as on one another's records.

Most jazz musicians at this age are studiously copying the styles of their predecessors. What makes the Brooklyn cluster different is their decision to pay serious attention to popular music. They are from a generation in which even musicians heard "soul"

Errol T. Louis is a freelance writer who lives in Brooklyn, as well as a self-described "closet" saxophonist.

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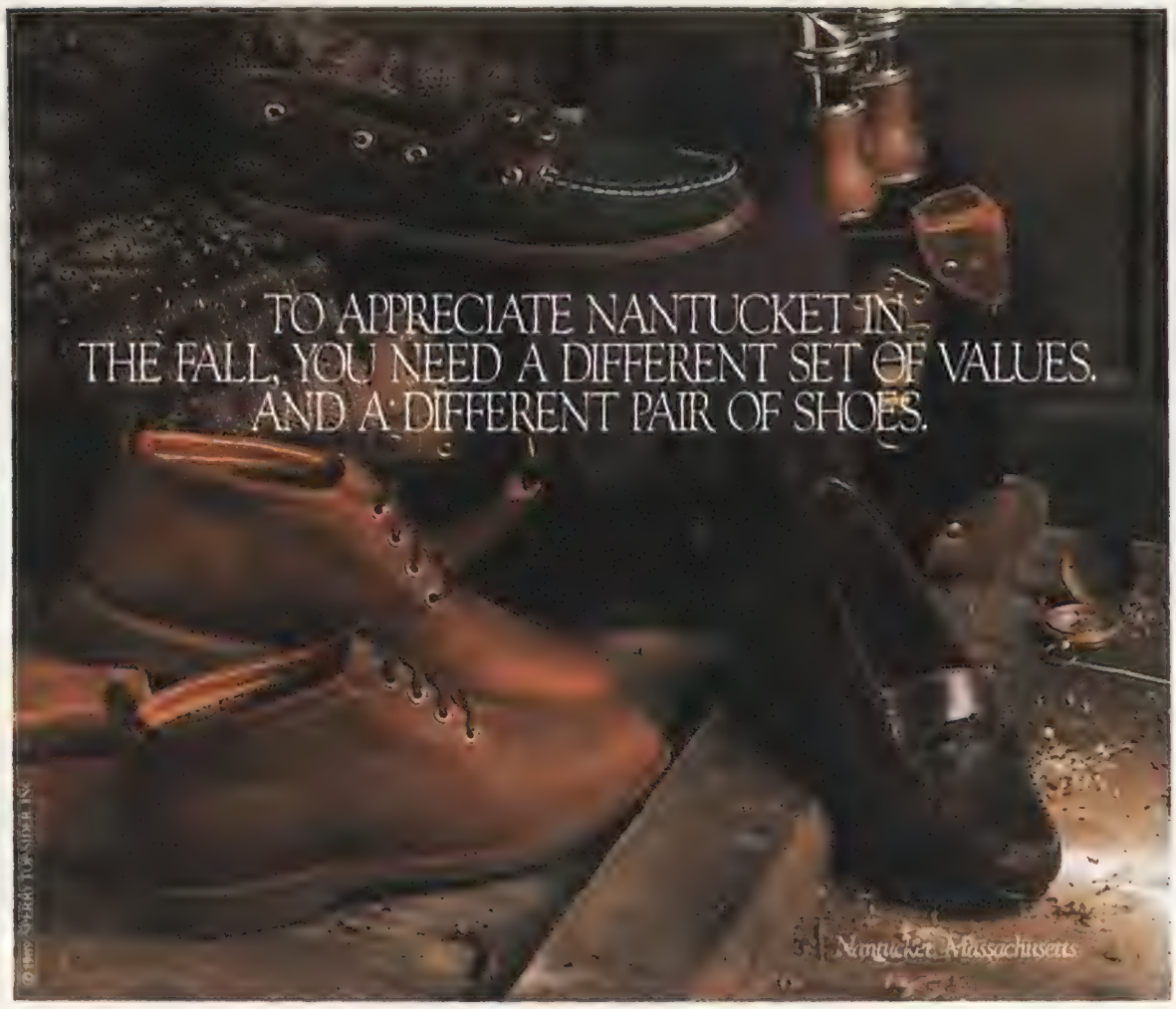
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music on the radio by stars like James Brown and Stevie Wonder long before ever encountering the records of Louis Armstrong and Charlie Parker. Unlike many other jazz students, they have chosen to give the old and new sources equal standing as sources of inspiration.

"I grew up on soul music," says the 31-year-old Coleman. "I wasn't into jazz until I was 16," he recalls. "It's more of a learned thing."

If jazz was an acquired taste for Coleman, so was the saxophone. In high school he was studying violin but developed a crush on a pretty girl who was already playing saxophone in the school band; Coleman switched to the horn so that he could ask her for pointers.

Growing up on the South Side of Chicago, Coleman lived within walking distance of blues and jazz clubs, but like most kids he was more interested in comic books, kung fu movies and the latest soul records than in the bebop his father loved and nudged him toward.

The change came in college. As a freshman at Illinois Wesleyan Univer-

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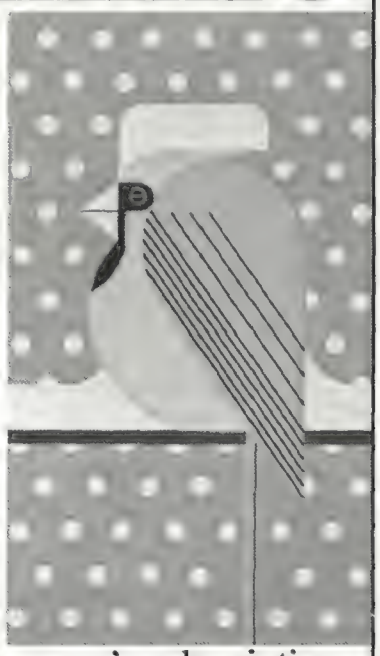

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sity, Coleman joined the jazz band but the instructor told him he didn't know how to improvise. Back in his room, disheartened, he came across a Charlie Parker record (secretly slipped in among the other albums by his father). To find out what improvisation was about, he played the album. A lot. Then he started looking for more.

He played the records a speed too slow, at 16 rpm, until he could copy the solos note for note. He read books about the saxophonist. Before long, he was making a nuisance of himself at Chicago jazz clubs, hanging around older musicians who had played with Bird (much the way the young Parker had haunted the Kansas City dance halls). Finally, in 1978, he hitchhiked to New York, found a YMCA to stay in, and began a routine of playing on the streets by day to make some money, then frequenting the downtown jazz clubs at night.

Today, Coleman's music reflects his haphazard introduction to jazz; one can detect clear signs of the pre-Parker influences (the name of his band, Five Elements, is taken from a martial-arts movie). On one song, while the band gets whipped up into one of Coleman's rhythm storms, he yells like a comic-book hero, "Follow me, band, while I shift to hyperspace!"

"Coleman can sing you Charlie Parker solos from the beginning to the end, note for note. Osby is a Cannonball Adderly fanatic," says Geri Allen, a 32-year-old pianist. "All of these people are really in the tradition."

Well, yes and no. Allen herself, a prolific composer and bandleader from Detroit, likes to reinterpret music in new ways, too. A founding member of M-BASE, she is no longer part of the collective, although she still plays with some of the musicians. One of her songs, "The Dancer," is a piece built around the patter and shuffle of traditional tap dancer Lloyd Storey, also from Detroit, whom she invited into the recording studio. One critic noted, "It's probably the only album ever recorded with synthesizers

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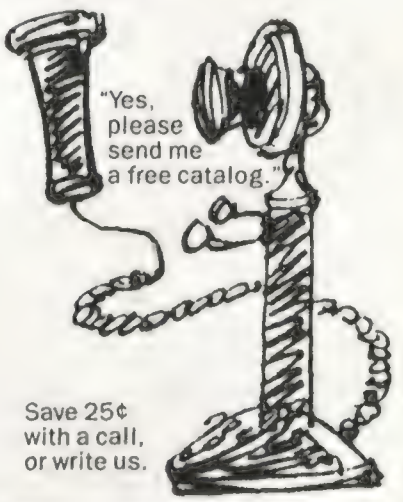

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and tap dancing in the same tune."

When Allen started piano at age 7, it was the natural thing to do: both of her parents liked to tinkle on the house piano. Her father, an elementary school principal, would occasionally bang out old boogie-woogie numbers. But she was growing up in Detroit in the 1960s: "Motown was everything you heard on the radio, and that was what you danced to, and that was what you talked about in school. Those were my heroes," she recalls. "It wasn't until later that I became interested in improvising. I directed myself to grow into it because there was something intriguing about it. It was very full of dignity."

It wasn't *all* dignity at first. A prominent older musician, trumpeter Marcus Belgrave, was an artist-in-residence at Allen's high school and soon became a mentor. "I started working with him," she says; "he hired me, even though I wasn't ready, and put me in these situations where I'd be painfully embarrassed." Her first professional performance, at age 16, was traumatic. At the end of one song, another pianist, a "really great Detroit bebopper," approached her in full view of the audience. "He told me to get up and let him play, and he would show me how it goes. Yeah, I got up. It didn't feel good. But the next time you come back to a situation like that, you know the music. I mean, they won't call *that* tune on you and say, 'Let me show you how it goes.' "

Such tough early experiences are common among the young players in Brooklyn, bent on finding their own directions. Ordinarily, musicians their age would be putting in long hours mastering the jazz musical canon—the hundreds of songs that have become favorites over the decades.

Probably the most famous example is the Tin Pan Alley warhorse "I Got Rhythm." Written by George and Ira Gershwin for a 1930 Broadway musical called *Girl Crazy*, it became the harmonic structure of literally hundreds of later jazz songs. Today, some 60 years later, studying the succession of chords present in "I Got Rhythm" is still central to every jazz musician's early education.

But times have changed. Few of the Brooklyn collective have ever seen

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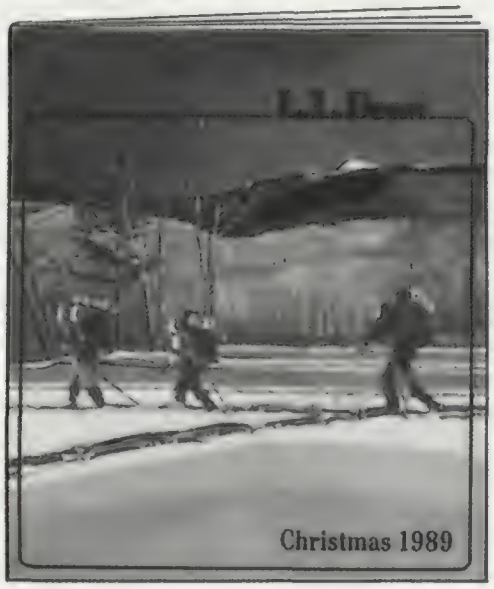

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Girl Crazy, and the first variation of "I Got Rhythm" most of them ever heard was probably the theme song of the television cartoon *The Flintstones.* While the musicians have a solid grounding in the jazz canon, they have also thrown open the doors to include almost any experience as fair game. The list ranges from cultural junk food—the comic books and kung fu movies—to classical music, computers and more serious social concerns, like homelessness.

They are trying to do more than just describe things taking place around them: they want to incorporate different experiences into the pace and structure of a tune—an idea as elusive as it sounds. "I'm trying to play life," Coleman says.

A few years ago, after playing a concert in Rio de Janeiro, Coleman was walking near the water and noticed the slow, rhythmic way Brazilians stroll along the beach. Later, on the plane back to New York, he wrote a tune called "First Sunrise," in which the irregular, relaxed, stop-go rhythm is a musical demonstration of that particular walk.

In trying to "play life," Coleman and the other Brooklyn musicians will often use complicated, irregular rhythms that somehow remain catchy and even danceable. The average listener is used to songs that are divided into the even meters of two or four—the kind of steady, repeating

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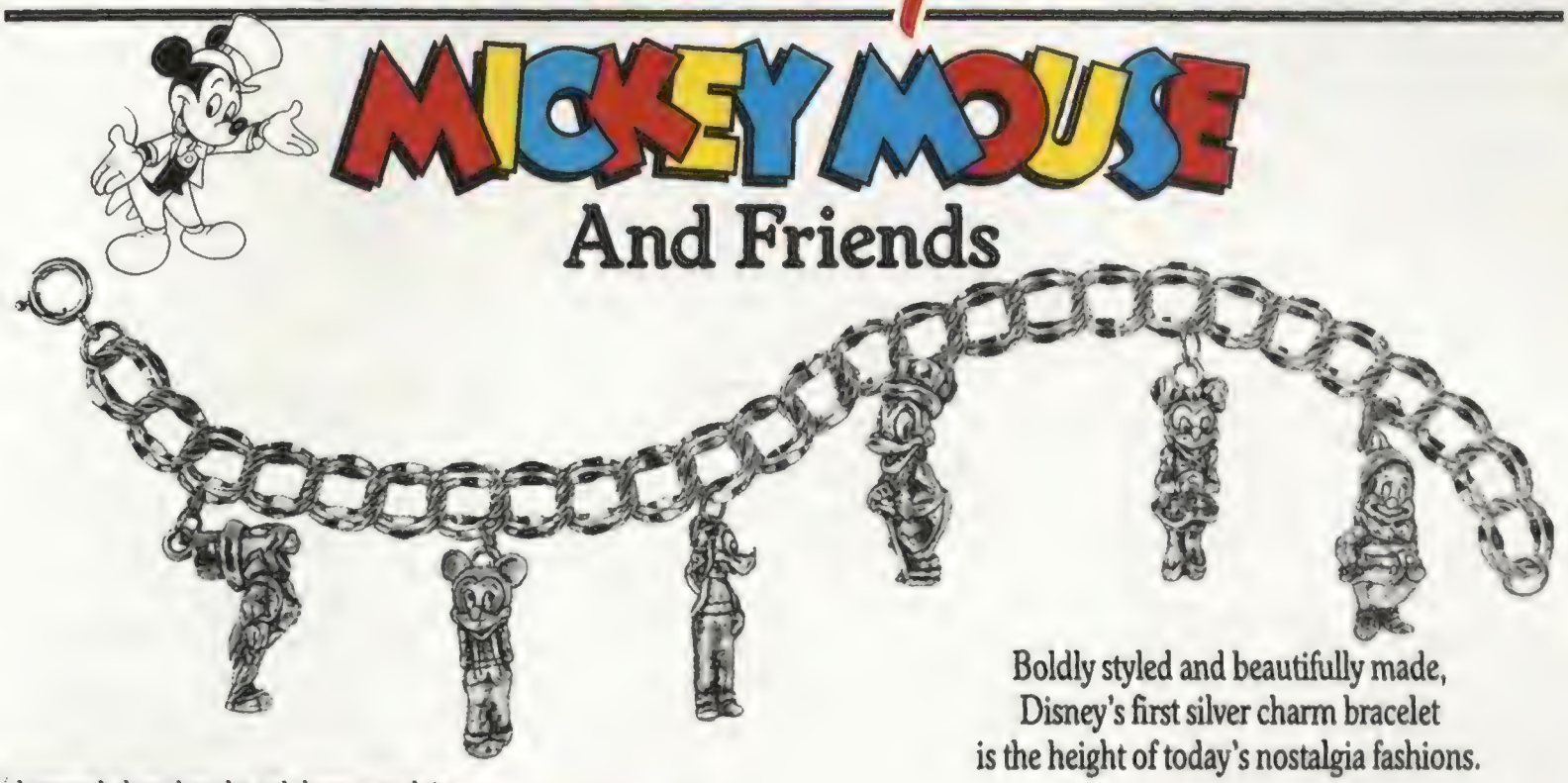

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pulse found in a street parade or in nine-tenths of the music played on the radio. Accustomed as most of us are to Western music, we almost naturally divide musical phrases into fours.

A song by Osby, Allen or Coleman, however, will often be set in 4½, 5, 11 or, more often, an overlay of several odd meters at once. This is a musician's nightmare under any circumstances; the Brooklyn players make things even more interesting by making the music swing. As Motown fans, they know a good song is supposed to make you want to dance.

The complex, ever-shifting rhythms of their music may well be a reflection of these young musicians' lives. Trombonist Robin Eubanks, at 33 one of the oldest, is an example. In a single week, he might be serving a short stint in one of the established jazz groups in New York, or playing in the pit orchestra of a Broadway show, or blowing on seashells as part of an experimental ensemble. He has served as musical director of Art Blakey's Jazz Messengers, an ever-changing group that for decades has showcased the hottest young jazz players; he has

Drummer Marvin (Smitty) Smith (center) and band member meet fan after set.

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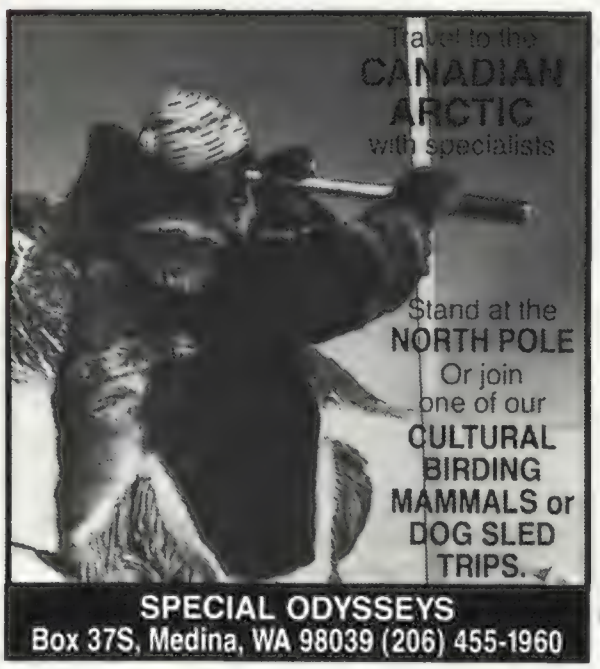

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played on television shows and in one major movie, and once toured with pop superstar Stevie Wonder.

At one point in the early 1980s, bored by standard jazz, Eubanks nearly stopped listening to music for an entire year. "I decided to pull out, and just listen to sounds," he says. "I would get these tapes and fall asleep listening to an hour of seashore sounds. Or an hour of rain." Shortly after that, Eubanks became a Buddhist. In keeping with the religion, he chants every day, which is now his main source of musical inspiration. "I'm considered the conservative within M-BASE," he says. He means it.

Eubanks shares an apartment with Coleman, and parts of it look more like a computer laboratory than an artists' nest. At Eubanks' work area, wires crisscross in a kind of spiderweb. Electronic piano keyboards, a drum machine and an amplifier are all patched into a personal computer; so is an electronic drum. (His trombone is nowhere in sight.) If one plays the piano keys, or hits the drum machine, the computer records the music and displays it on the screen—the pitches, the harmonies, the gaps of silence between notes, and so on.

And the process works both ways. By typing directly into the computer, one can instantly alter a song in many different ways, then play it back to hear what the changes sound like. The effects can be startling. Eubanks punches a few keys and a composition he's already registered with the computer is played backward—not only are the notes played in reverse, but the rhythms are inverted. It is, to a listener, a brand-new tune, and one that is only faintly reminiscent of the original version.

Coleman has recently taken the computer a step further. A software program that he has written can actually do its own improvisation—generating spontaneous (but coherent) melodic lines to go with different background chords.

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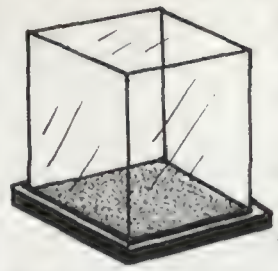

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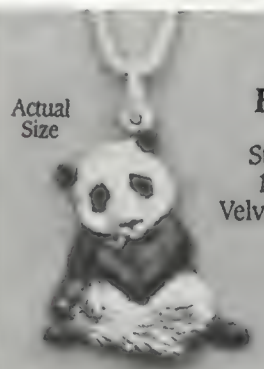

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chestral compositions: it can remember several different musical lines, then play them back separately or all at once. Several members of the collective, to learn a new piece of music, will pick up a wallet-size floppy disk from the composer, take it home and stick it in their own computers, then listen to the whole composition or just one particular part. All of which, needless to say, is a long way from practicing "I Got Rhythm" for the millionth time.

Life isn't all high-tech automation for the musicians. In fact, one thing most of them have had in common is a precarious existence. The economics of jazz can be deceptive. Jazz musicians, unlike rock performers, earn most of their money through performances and royalties on compositions, not through album sales. Worldwide, the break-even point for a jazz album by all but the biggest names is about 5,000 copies, with Japan and Europe usually accounting for two-thirds of those sales.

Smitty Smith's band rehearses for a performance at the Knitting Factory, an avant-garde club in New York City.

One small firm, Minor Music, was started in 1984 by a young German booking agent, Stephan Meyner, who heard Geri Allen play piano and decided on the spot to go into producing and distributing records. Allen's recording debut with a group of her own became Minor Music's first product and Allen remains the company's most successful jazz artist.

Another Munich entrepreneur, 31-year-old Stefan Winter, had a similar

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Coleman, checking sound on Prospect Park Bandshell, often gives band a few complex rhythms to play at once.

experience: on his first trip to New York, he heard Steve Coleman and decided to launch his own record label (the first album was also Coleman's first). Winter's JMT is now the main source of records put out by the Brooklyn collective.

Meyner and Winter are both quiet and intense. Like the musicians they represent, they see themselves as agents of musical change. Neither of them wants to leave Germany, so they end up calling New York almost nonstop, and commuting every few months.

"When we started, nobody knew about Geri Allen outside of the New York musician circuit," boasts the 32-year-old Meyner. "Major American companies are not interested in picking up an artist for the first time."

"They have lost belief in good music," says Winter of the big record companies. As a result, he believes, American audiences get less exposure to new music than European ones. The jazz albums Winter has pressed tend to sell better in Europe than in the United States at first; over time American sales catch up.

American record companies all but ignore jazz, claiming the market for it isn't profitable enough. At the same time, their refusal to give strong circulation and advertising to any but a few jazz musicians makes the prophecy self-fulfilling. The same dynamic governs the scarcity of jazz on radio. As a result, the musicians are better known, with more opportunities to work, in Frankfurt than in Brooklyn.

The irony is not lost on the musicians. "Americans are ignorant, and I don't say that in a slanderous way," notes Five Elements bassist Kevin Bruce Harris. "Kids don't learn the music because it's not in the house. It gets to be like young black Americans—and all Americans—are embarrassed about their own culture."

Eubanks believes that the American companies, by neglecting the music, have helped create an obstacle to understanding. "There's no way you can really love jazz and still have a tremendously negative view of black people, because they'll be your heroes," he says.

Whatever the reason, new jazz from Brooklyn is mostly distributed by companies in Munich, not Manhattan. But this state of affairs may change—at least, so the musicians hope. Last year, the Brooklyn Academy of Music, a major artistic showcase universally

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known as BAM, began to pick up on the favorable press given to the "Brooklyn scene" by jazz reviewers.

A two-day concert, billed as "M-BASE Jams at BAM," was a swirl of creative anarchy. The musicians wrote original songs for the concert (although, true to form, they hadn't named the compositions as late as two days before the show). Meanwhile, media interest snowballed into well over 200 press inquiries from around the country and as far away as Japan.

The concert itself was a kind of coming out party. For many jazz lovers in the audience, the musicians had the same status as the old Brooklyn Dodgers—the home team making good. Mixed in with the applause were war whoops and party yells. M-BASE, wrote one New York reviewer, more than lived up to its reputation as the "new vanguard of Black music."

And this fall, BAM is including many of the musicians in an even grander presentation, the tenth anniversary of New Music America, a nationwide showcase for music that tends toward the experimental. Osby will be presenting his latest ideas—presumably to a more enthusiastic response than he once met with; Coleman and his computer will be giving a concert; Graham Haynes will play trumpet with his new seven-piece band; Allen will compose and play music to accompany an old silent film, *Scar of Shame*.

But such breakthroughs aren't the only bright spots for the musicians. Life after BAM has meant more recognition for many of them. On the heels of a recent tour of Europe, Allen performed with a trio at a New York jazz club. On the last night of the engagement, at the start of the last set, murmurs run up and down the bar, and heads turn to follow a well-dressed, quietly dignified man who's just walked in. It's Ornette Coleman. The same Ornette of odd sounds and horn thrown off hill; the Ornette who has recently begun a comeback—not as an upstart but as a master finally acknowledged, a member of the jazz establishment. This same Ornette, who is rarely seen in local clubs like this—although he did turn up to hear an earlier performance by Allen and her group on his 60th birthday—pays her the ultimate compliment: he stays until the end. And he listens carefully.

Musicians who belong to the M-BASE collective rehearse onstage at the Brooklyn Academy of Music for a concert that brought them new acceptance.

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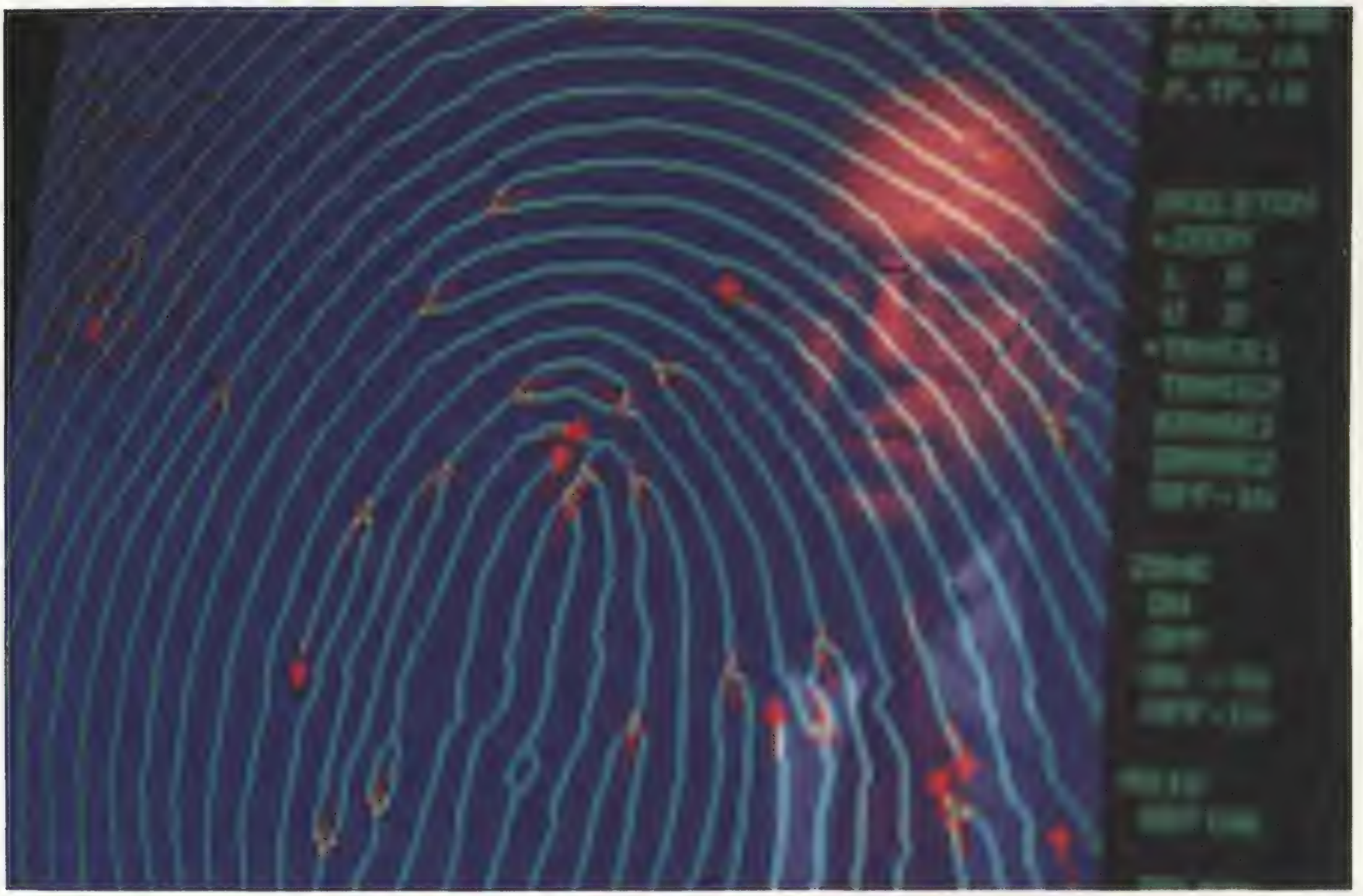

A "latent" fingerprint, blown up on an 11-inch screen, is minutely examined by San Francisco Police Inspector Ken Moses. Superimposed markings help him evaluate distinctive line endings and bifurcations.

By Jack Fincher

Lifting 'latents' is now very much a high-tech matter

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It fell to Moses, as investigator at the scene of the crime, to check the prints against those on file. Should the intruder have a criminal record and a match be made, police would be well on their way to identification, arrest and conviction. To both judge and jury, few pieces of physical evidence are as persuasive as fingerprints. So strong is the implication of an alien print that, in most cases where such identifying evidence exists, even the most tenacious defense attorneys are tempted to throw in the towel.

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A murder suspect's revolver is squirted with a red dye that will make latent fingerprints fluoresce when scanned by a laser light.

fingerprinting generally remains a chancy affair at best. In an imperfect world such prints, unseen by the naked eye and known as "latents," often turn out to be fragmentary, smudged or, worse, left on absorbent or shiny materials that resist yielding up fully recoverable marks of identity. Many prints must have exactly the right dusting powder or chemical lifting agent applied to them in order to be read at all.

For that matter, some prints are simply missed altogether during the initial crime investigation. A nationally known expert who has been consulted in more than 7,000 cases claims he often finds prints overlooked by the old-fashioned dusting methods that are still the norm nationwide. Surprisingly, one in four ink-pad prints taken by the conventional press-and-roll method is routinely botched and rendered useless. Small wonder, then, that in the courtroom a really solid match involving latents is so very valuable.

None of this was what troubled Ken Moses, however. His problem was finding a match without any data beyond sex (the fleeing killer had been seen) to narrow the search. Assuming the culprit even had a record, such a quest was a needle-in-the-haystack proposition. It would entail a mind-numbing procedure known as a "cold make," and might require that latent prints be compared, manually and repeatedly, with every print on file from about 400,000 people arrested in San Francisco over the past 45 years.

In 1978, police in most big cities rarely bothered "running" latents manually unless the scope of the search could be limited by other evidence. Lacking major leads, crime-scene prints were taken only to make victims or their families feel that everything possible was being done. Fortunately for Moses, San Francisco's police department was different. It had (and has) a policy of following up a cold make indefinitely. And Ken Moses has a reputation as a bulldog. So long as there was the remotest chance of a cold make in homicide, the case never left his desk.

Jack Fincher writes frequently for SMITHSONIAN. *A recent article dealt with the influenza epidemic of 1918.*

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Moses thought he had prints of a right index, middle and ring finger, as well as the rough configuration of a fourth print that the killer had left too smeared to identify. Even so, with a hundred file cards to the inch, Moses was facing more than ten yards of meticulous file card examination—perhaps 40,000 people or 400,000 prints in all, each a potential match. He began looking in 1978 whenever he could snatch time away from the department's current caseload, and six years later he was still at it. By then there were possibly 100,000 prospects left. Enough to fill up his spare hours for another two years—and perhaps to leave him ultimately with the realization that the killer might be a first-time felon.

But high-tech help was on the way from unexpected quarters: the silicon chip and the laser have lately been revolutionizing and refining the uses of fingerprints, not merely for crime detection but for security checks, and even for startling new aids in the field of diagnostic medicine.

By 1980, for instance, Personal Touch Verification Devices, known as

When bathed in laser light, otherwise-invisible fingerprint glows brightly.

On treated paper, laser beam turns Roland Menzel's prints yellow.

laser locks or PTVs, were coming onto the market to help maintain security in everything from sensitive defense installations and computer labs to bank vaults and deluxe wine cellars. Utilizing a limited data bank of stored employee fingerprints, PTVs controlled access by electronically transmitting—and instantly searching out—the laser-copied ridge lines of any finger pressed on a glasslike plate by anyone seeking entrance. It was only a matter of time until such sophisticated search methods were expanded and refined in order to handle the large numbers of criminal prints on file.

Sure enough, in 1978 Ken Moses found the answer to a print man's prayers in a technical computer journal: new customized computers capable of electronic searches that could compress years of manual search into mere minutes. He succeeded in having a system written into the department budget. It was promptly rejected because of a crunch in funding. Undaunted, he got permission to solicit funds privately, formed a citizens group and went around the city giv-

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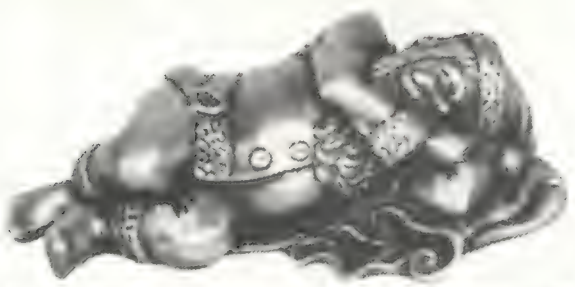

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ing speeches on the need. "We didn't raise much money," Moses recalls, "but we did raise the level of public interest considerably."

And how. In 1982 his group managed to get the issue on the ballot as a public referendum, where it passed with 80-percent approval. Money was appropriated, bids advertised and two years later (six years after the crime) San Francisco's police department at last unveiled its new $22 million Automated Fingerprint Identification System (AFIS). Flushed with triumph, Moses asked to use the system to find a fingerprint match he still hadn't made on the heinous murderer of the San Francisco woman.

First, he made a tracing of the print's ridge lines on a plastic sheet, dropping out the shaded halftones made by the pressure of flesh. Next he fed the tracing into the computer and flashed its magnified image onto the screen. Using an electronic probe, Moses then located and outlined the core, or crudely concentric heart, of the ridge pattern, and bisected it with computer-generated vertical and horizontal lines, orienting the computer image to the fingerprint. Then he marked those telltale points where the lines split and end (p. 201).

The computer then connected these points into a geometric web and translated the web pattern into a series of binary code numbers. These codes were compared with other print codes stored in the computer's memory bank. Degrees of likeness were automatically digitized into numerical values and tabulated as scores.

In less than 60 seconds, Moses felt like a pinball champ who has just smashed the house record for points. The screen glowed with identifications of the five nearest matches on file. There at the top was a score of more than 6,000, or *12 times* the one ranked second. It had to be a hit. Two days later the killer, who had previously been booked on a minor offense, was arrested and taken into custody. In 1985, he pleaded guilty to

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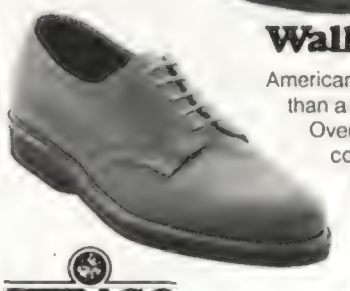

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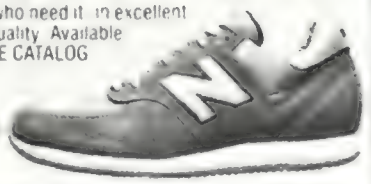

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first-degree murder and was sentenced to nine years in prison, a reduced sentence because he had committed the murder as a juvenile.

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Fingerprinting clearly had come a long way since 1894 when an American became the first lawyer in the world to use fingerprints in a criminal case. No, it wasn't Clarence Darrow. It was Pudd'nhead Wilson, Mark Twain's fictive creation, who freed his twin clients of murder charges with his curious hobby, eight years before fingerprints were successfully used by Scotland Yard to convict a man of stealing billiard balls.

Twain's prescient bit of science fiction tapped a rich and stormy vein of history that traces all the way back to ancient China. The oldest fingerprints ever found appear as small, indented dabs of clay that served as identifying seals on Chinese bills of sale dating from the third century B.C. According

A weak print, treated with ninhydrin, is barely visible under a laser beam.

to ancient writings, however, Babylonians during Hammurabi's reign, nearly 2,000 years before Christ, used fingerprints to seal contracts. Scholars tell us that both of these examples mainly had to do with the ceremonial belief that the hand conferred a sacred, binding cachet on any act of negotiation that it touched.

Not until 1858 did the crime-fighting potential of fingerprints occur to the English-speaking world. That was the year when William James Herschel, a British administrator in India, employed fingerprints to thwart forgers seeking illegal pensions. In 1880, Dr. Henry Faulds, a Scottish medical missionary in Tokyo, published a paper in the British science magazine *Nature*, citing cases in which he had used prints found in grease on a drinking glass and in soot on a white wall to help convict or exonerate a number of Japanese accused of crimes. It was only then that Herschel chimed in, claiming to be the rightful pioneer of record.

Sir Francis Galton, inventor of weather maps, the teletype machine, the periscope and a supersonic dog whistle, was called in to arbitrate the

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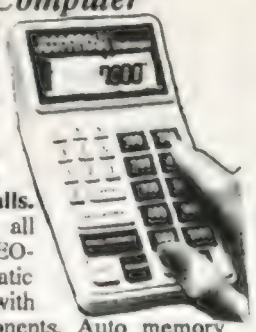

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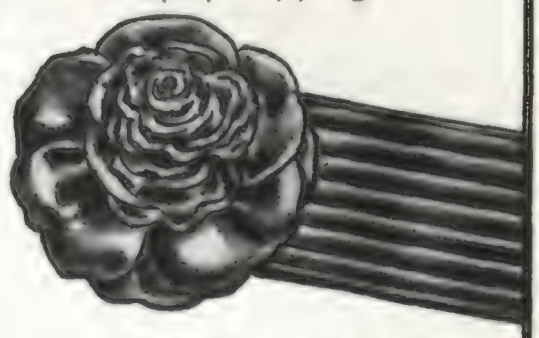

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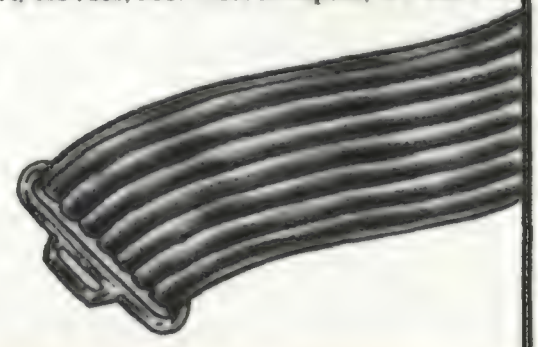

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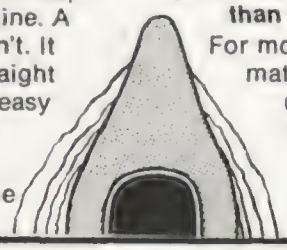

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matter. Galton was not one to shun a good idea, no matter whose it was. He declared for Herschel. But after prolonged study he devised his own system of fingerprint classification and in 1892 wrote the first textbook on the subject, asserting, as Faulds had, that fingerprints are never duplicated and remain unchanged for life. To prove it, Galton even followed one individual's fingerprints throughout a period of 50 years.

For the general public at the time, all of this was academic. In the eyes of the world the father of fingerprinting was neither Faulds, Herschel, nor Pudd'nhead Wilson, but one Alphonse Bertillon, an obscure Paris police clerk. Bertillon had flunked out of three schools and failed at half a dozen jobs before going into the army. Upon mustering out, thanks to his physician father's influence, he was given a job keeping records at the

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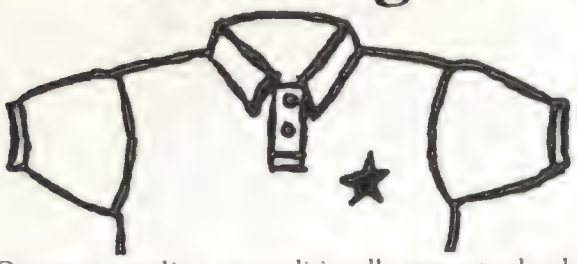

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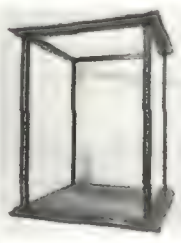

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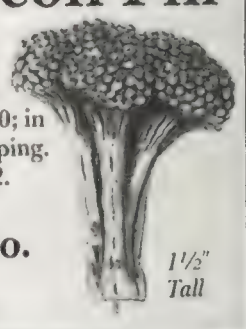

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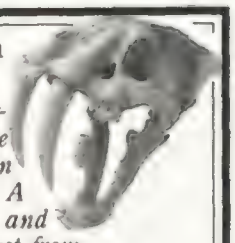

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Prefecture of Police. When he learned there was no way to link a new arrest to a crime on record, he sat down and devised a system of his own that became an overnight success, at just about the time Faulds and Herschel were squaring off in their gentlemanly war of words.

Irony of ironies, the man whose name was given to fingerprint technicians in the 19th century ("Bertillon officers"), began by utterly ignoring fingerprints in favor of measuring the head and torso, left foot, left forearm, left finger and right ear, a system that in 1893 he dubbed "anthropometry." Alas, the process was lengthy, time-consuming and ultimately flawed. Fine gradations on the calipers were at best hard to read, their measurements prey to small but significant distortions when pressure was applied by different hands. Besides, anthropometry was next to useless on growing youths and not much better in identifying aging citizens, who tend to shrink.

But Bertillon clung stubbornly to his methods and the system continued to flourish in France.

In 1896, however, the International Association of Chiefs of Police had started national fingerprint files in the

William Herschel was using prints to identify frauds back in 1858.

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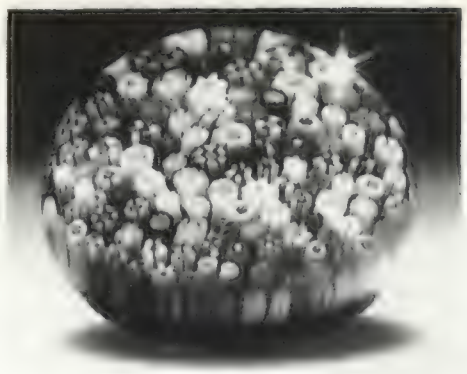

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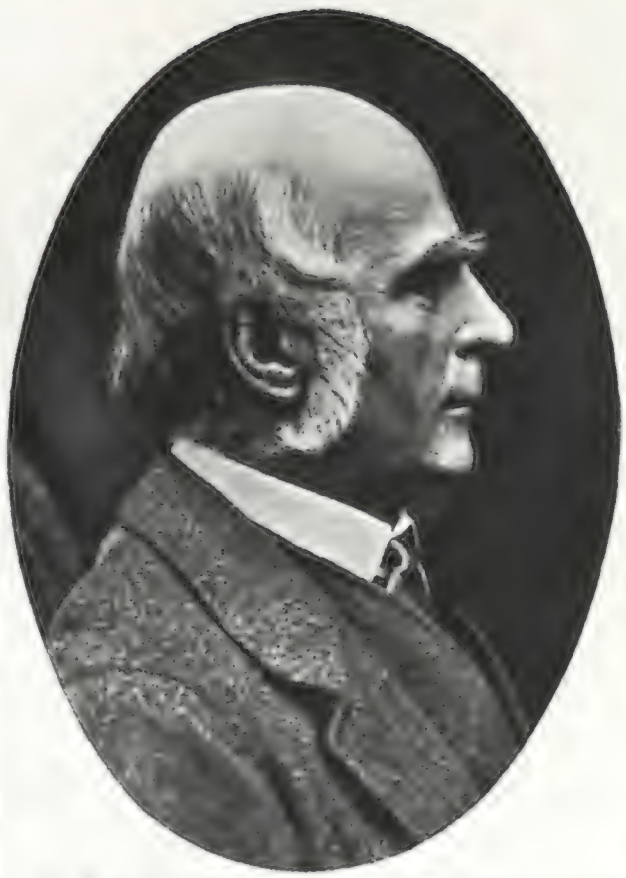

Sir Francis Galton wrote the first textbook on fingerprinting in 1892.

United States. (These later were moved to Washington, D.C. and eventually became the nucleus of the FBI's identification division.) As fingerprints grew in police popularity, Bertillon grudgingly added them as an adjunct to his system but made no attempt at rigorous classification.

In 1902, almost against his will, Bertillon became the first man to identify, solely by fingerprints on record, an unknown culprit who was not yet a suspect. Latents were found on the shattered glass door of a cabinet in the Paris apartment of a murdered man. After Bertillon matched them, the killer's photograph was circulated, leading to his arrest and conviction. But the downfall of the Bertillon system came a year later with a resounding crash, through a bizarre event that occurred half a world away at the U.S. Federal Penitentiary in Leavenworth, Kansas.

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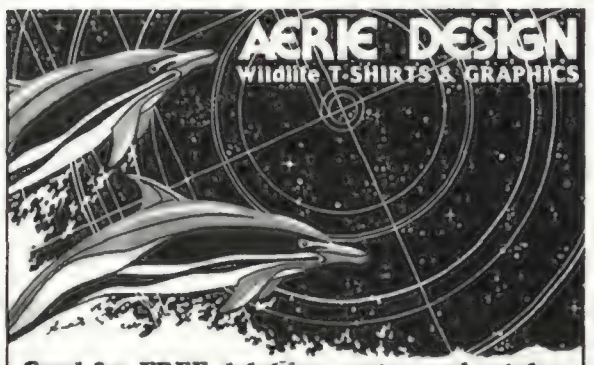

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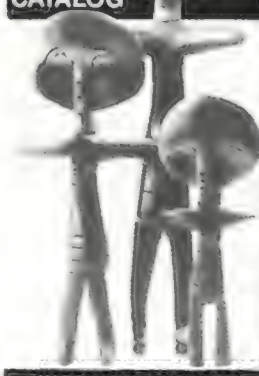

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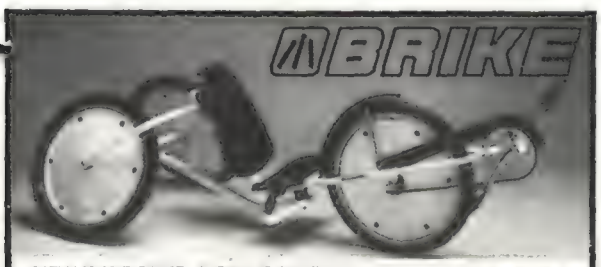

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record for William West that he knew was on file: photograph, Bertillon measurements, fingerprint card. Will West stared at the picture in consternation. "That's me, all right," he said. "But I swear I've never been here. Why would I lie?"

With growing irritation the officer took Will West's Bertillon measurements and compared them with those on file. They were as alike as normal measuring error would permit. But the officer was flabbergasted to find that the fingerprints were radically different! In 20 minutes a guard brought in a lifer who had been at Leavenworth for two years. Will West and William West gaped at each other in stunned amazement. Biologically unrelated, they not only shared similar names but resembled each other (p. 208).

Throughout the world of criminal investigation Bertillon's overblown reputation swiftly evaporated, though his method persisted vestigially in some European countries such as France, which has used photographs of the right ear and profile for identification on driver's licenses. Francis

France's Bertillon tried to identify by right ear and bone measurements.

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Galton's fingerprinting identification method was ultimately revised in 1897 by Sir Edward Richard Henry, whose system is used worldwide today.

It wasn't until the turn of the century that police departments began to use fingerprints systematically. In 1904 Scotland Yard detectives guarding an exhibit of crown jewels at the St. Louis World's Fair taught their American counterparts the basic techniques of dusting for prints that are still with us. Only two years later a New York detective repaid the favor by using British file prints to nab a visiting English hotel burglar.

Within a decade New York State had adopted fingerprinting as its identification system for civil service applicants and prison inmates. The Armed Forces soon followed, and in 1911 the Illinois Supreme Court upheld both the legality of fingerprinting and the right of technicians to testify as expert witnesses. Fingerprinting had arrived.

Technologically, apart from introducing new chemicals such as iodine, sulfur dioxide and silver nitrate for different difficult surfaces, the practice of fingerprint detection remained pretty much at a standstill for years. But even an Isaac Asimov would be hard put to surpass the futuristic overtones of what has been happening lately: chemicals that react with amino acids in minute residual amounts to color, draw out and fix the latent imprints of the fingers that made them; laser light that excites into a telltale fluorescence the finger's unseen trace of molecules left behind; computers that spurn Galton's complex linear architecture for a simpler, digitized topography.

In four years, from 1984 to 1988, armed with AFIS, the new system, San Francisco police have run 13,425 latent searches and have hit on 2,752 identifications—20 percent or better, and almost four times the national average reached manually. In the process the department has cleared 2,267 cases from the books and has solved 98 homicides that had been gathering dust. In addition, AFIS has put 1,580 burglars in jail, cutting the city's larceny rate by 25 percent. More than half of the 50 states now have computerized print-identification systems—and many of the smaller ones will probably be networked to the others. AFIS is beginning to take a king-size bite nationally out of the

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Most dramatic of all, using a latent print from an automobile linked to Southern California's infamous "Night Stalker" serial killer, programmers for the state's Department of Justice at Sacramento worked all night in the fall of 1985 to bring on-line its expensive new system, which today can retrieve 6.2 million prints. The next day the system's latent-print data base spat out a high-profile print in just three minutes, a match-up that Los Angeles police estimated would have taken an expert technician 67 years in a manual card search. Only two days later, a 25-year-old drifter with a long arrest record for drugs and car theft was charged with one of the 15 murders.

Recently, California has joined with ten other Western states in plans for the nation's first computerized regional identification network, one linking the existing individual data bases of five states to a new centralized computer serving the other six. "When fully operational," says California Attorney General John K. Van de Kamp, "we expect the new system to give law enforcement in all 11 states access to the fingerprints of more than 14 million people."

Clearly, fingerprint detection in crime will never be the same again. And forensically the new day is just dawning. The burgeoning technology has set laser light and organic chemistry the tricky task of enhancing latency for detection.

In 1976 a physicist named E. Roland Menzel was investigating the use of lasers with semiconducting organic compounds in photocopiers for the Xerox Research Centre in Toronto. A colleague had a neighbor who examined latent prints for the Ontario police department and wanted to know if lasers could potentially aid in detecting them.

In principle, yes, Menzel replied. Some of the infinitesimal organic residue of a fingerprint naturally radiates energy whenever its molecules absorb

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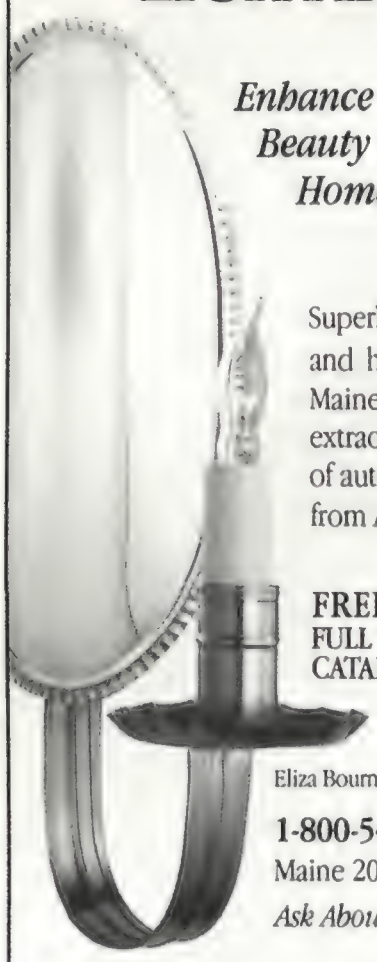

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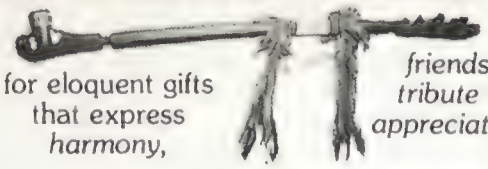

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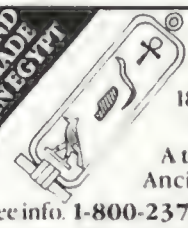

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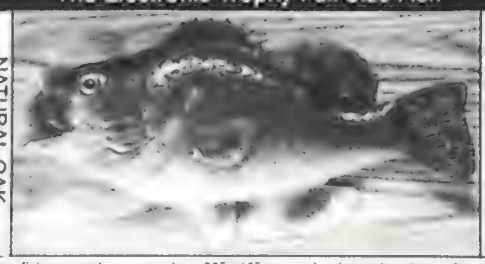

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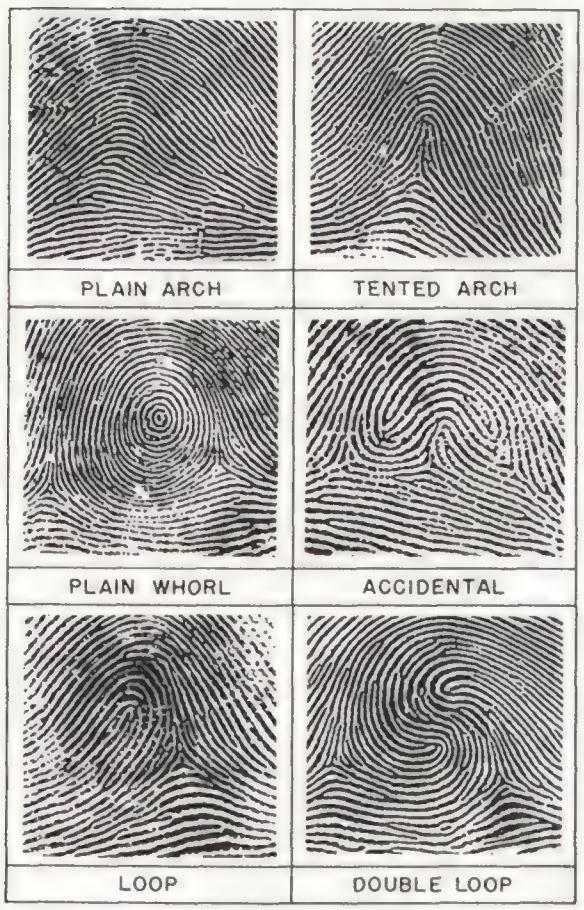
light, much as energy pumped electrically into the atoms of an incandescent lamp filament causes them to emit light when you turn on a switch. The process is just so low-grade in most natural fluorescence that we rarely see it. But Menzel knew that if you pumped enough light energy of an appropriate wavelength into a population of fingerprint molecules to excite them en masse, the result would probably be visible under the right color of filter. This, high-powered lasers could do. Which, after all, was what the term "laser" meant—Light Amplification by Stimulated Emission of Radiation.

Menzel decided to try it using a piece of black electrical tape thought to be impressed with a latent fingerprint on its sticky side. Because of that adhesive coating, the surface could not be effectively dusted or treated chemically without the risk of ruining whatever might be on it. Under laser excitation a faint, greenish-yellow spot



These are six basic patterns used by the FBI in classifying fingerprints. The presence or absence of whorls is one of the primary classifications.

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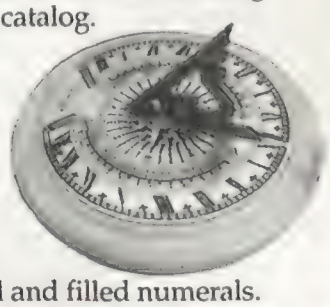

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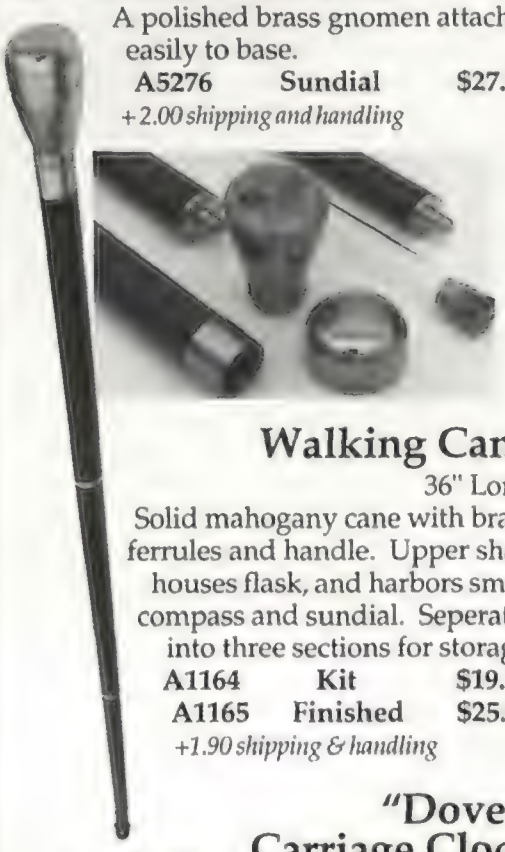

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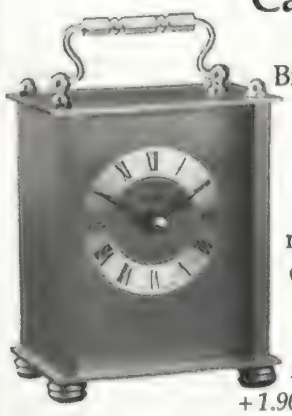

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Six-mile-long assembly line at FBI headquarters in Washington, D.C. helps 1,200 employees sort and match some 184 million prints now on file.

emerged, but no fingerprint ridges in detail visible to the naked eye. Not discouraged, Menzel set up a camera, took a 20-minute time exposure, developed it and found he had a clear fingerprint.

Today, using chemicals like ninhydrin, which reacts with the minute amounts of amino acids in the sweat on our fingertips, and cyanoacrylate, an ingredient of Super Glue, technicians can often coax out, color and fix with a fidelity that stands up in court the unseen imprints of the fingers that made them.

If that fails, laser beams can now be employed in several ways, most directly by exciting into fluorescence the waste molecules of exuded trace compounds that fingers leave behind, such as riboflavin, a B-complex vitamin derived from our food. Present in as little as a nanogram (one-billionth of a gram), organic fluorescence can sometimes tell a tale that chemistry alone cannot, and do it years after the criminal touched the surface. And, unlike the more glamorous DNA sequencing, which requires either body fluid or tissue samples to do its genetic work, these new fingerprint-retrieval techniques invade individual privacy less than a hearty handshake.

Today, Menzel and his Texas Tech University team are hard at work on the tricky problem of how to use laser beams to lift fingerprints off smooth or porous surfaces that respond with their own fluorescence, often masking the fluorescence of the fingerprints left on them. That means everything from soft drink cans designed to "light up like Christmas trees" to ordinary brown paper sacks that unexpectedly "glow like a bandit" under laser light. To that end Menzel is custom-crafting compounds that can lengthen the life of a fingerprint's fluorescence *beyond* that of its background surface. Usually this is done with the help of an electronic monitor that controls the laser light and triggers an imaging device as the fluorescence of the can's surface fades (p. 218).

All this is research still. To apply the techniques more widely in crime detection will require more funding, a difficult thing to get these days. Smaller states, cities and counties are reluctant to spend money on exotic gadgetry when they can hardly keep their schools and libraries open. Just the cost of training personnel in new fingerprint technologies will be for-

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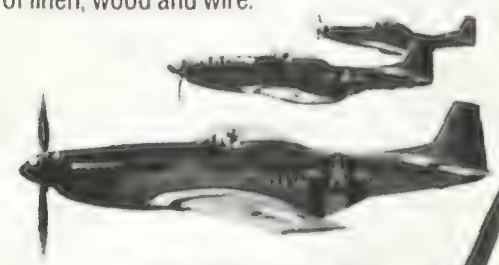

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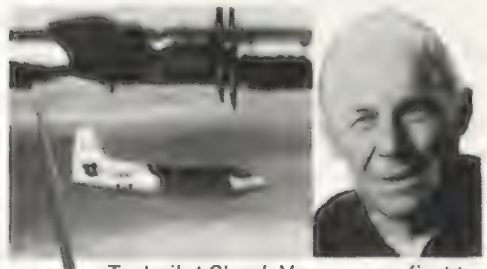

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midable. The International Association for Identification has only 2,500 members, of which only about 850 are fully certified fingerprint examiners. Most of these had to be trained slowly, and on the job.

Then again, the most advanced method of making fingerprints—the laser "live scan" used in PTVs—still causes trouble electronically in ways that make strong policemen weep. "It can be *too* good," a veteran fingerprinter told me. "When the computer compares the code for a high-contrast laser image with that of the *same* finger's inked impression on file, it sometimes concludes that it's looking at *different* prints!" Which means that in practice this generation's investigators sometimes still find themselves at the mercy of yesterday's fallible methods of inking and dusting.

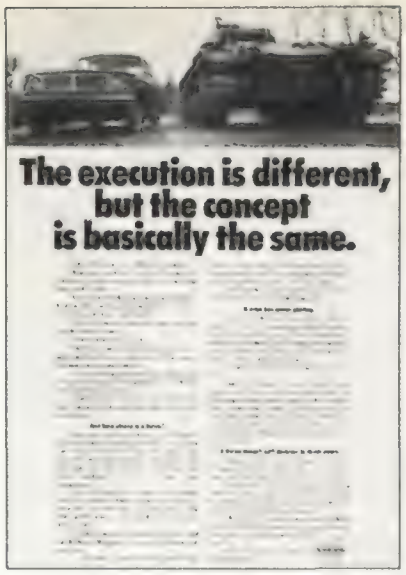
Though such difficulties in criminal investigation still need to be ironed out, fingerprint technique may soon provide a powerful diagnostic tool in the field of medicine. As far back as 1926, Dr. Harold Cummins of Tulane University coined the term "dermatoglyphics" to describe the scientific study of friction ridge designs on hands and feet, and their possible anatomical and biological significance. Since the late 1950s medical researchers have associated certain fingerprint features with major chromosomal abnormalities that cause birth defects such as Down's syndrome. Doctors at Johns Hopkins, New York University and the National Institute on Aging, among other institutions, are now studying dermatoglyphic patterns that may be linked to a wider range of ailments, including hyperactivity, dyslexia, Alzheimer's disease, breast cancer and diabetes.

Preliminary primate research by David A. Dell and Bryce L. Munger at the Pennsylvania State University anatomy department indicates that in the first four months of gestation the growth of nerve fibers plays an intimate role in laying down the precise topography of the individual fingerprint. "Abnormal fingerprints," they suggest, "could reflect abnormalities" of nerve development. Is it not too much to hope that certain variations in fingerprint patterns could serve as "test patterns," providing before birth an early warning of problems with babies' nervous systems as well as of other serious defects?

You have to wonder what Mark Twain and Pudd'nhead Wilson would make of that.

Filter shows how fluorescence of a fingerprint is partly revealed by laser light, but partly obscured by the can's naturally fluorescent red paint.

1961



1969

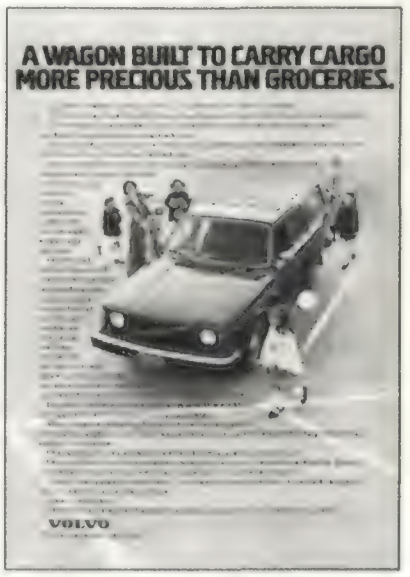
1971

1973

1974

1975

1976



1977

1985

1986

1987

1989

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Book reviews

Bird, Kansas
Tony Parker
Knopf, $19.95

Move over, Frances Trollope. Stand aside, Charles Dickens. You too, Oscar Wilde. Here comes another of your countrymen to take yet another "candid" look at "ordinary" America and its people, and to write a book about it. What kind of book? Step back, Studs Terkel, here's another oral history done in the style you made so famous.

The part of America our inquisitive Brit comes to with his ubiquitous tape recorder is identified in the title of the book, but don't look on the map of Kansas for Bird. You won't find it. As was Oz, Bird is a made-up name. And it's small. How small? Well, in quantity about 2,000 inhabitants and in quality a place where the most serious crime is running the one traffic light, where you don't lock your car or your front door at night, where everybody knows everybody, not to exclude family secrets.

Nor will you find discussion groups meeting weekly to argue civil rights, abortion views, gay and lesbian lifestyles. Bird is not exactly your hotbed of liberal thought. You have to go to the big cities—Topeka, Wichita—for that kind of stuff. Enduring, Fundamentalist, American Gothic Bird. The townsfolk know precisely where the county lines are, parents are "Ma" and "Pa," accounting is called "accountancy," and the state directly to the east is "Missoura." And every morning, regular as clockwork, the veterinarian rides her dapple-gray horse down South Jefferson Street to the office.

But other residents of Bird are less predictable and the author has cornered most of them. We get to listen in on conversations with storekeepers, homemakers, officials, the town's richest man (oil) as well as its poorest (booze and bad luck). We hear clergymen, the local hooker, the inhabitants of the poor section west of the town and those of the segregated black community just down the road. (Yes, you read that right. Even in Bird.)

When you do a word-association exercise on Kansas you come up with things like wheat, tornadoes, endless prairies, bluenose liquor laws, Marshal Dillon, Dorothy and Toto. But what about Bird itself? Let's hear how the residents answer that question. The Catholic priest, a native of Ireland and now a naturalized American, sees the town as "in many ways" the epitome of what America stands for, a "kind, decent, honest, upright community, with a clear sense of values, a strong idea of right and wrong. . . ." There are home-

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lier views, of course, such as the local bum's: "A small town and the usual story to be told about it of how there's good things and bad."

Some of the young people offer less charitable insights. To them Bird is a place where the only true ideal is conformity, where tradition gets preference over change every time. Bird is a pretty good place to grow up, they admit, but when they leave Bird for education or culture or career and then come back, they see not the differences but the sameness. Sounds a lot like the old Limited Outlook, doesn't it? And then there are all those failed first marriages, aren't there? And the racial prejudice and the three high school pregnancies last year and the kids going out of town for their condoms and birth-control pills. No place is exempt from the social stresses and strains, it would appear, not even good old Heartland, USA.

Parker doesn't editorialize. He lets the townspeople speak and whatever generalizations exist after all the talk will not be his, but theirs. The style in these oral histories is to pile interview upon interview, and there are times when the reader will yearn for some old-fashioned exposition. But Parker knows the art of the interviewer—he has been called Britain's best—and he knows that to capture the essence of a place you must see it from different angles and hear it in different voices. In the end, as you probably suspected when you first read the title, you will have gotten a far different impression of America than the one conveyed by *Dallas* and *Dynasty* and *Miami Vice*.

Is it a true picture? For Smalltown, Kansas, it is, and perhaps for an older, vanishing America as well, which was the intended range of Parker's verbal camera all along. And that's good. We need on occasion to go home again, to walk around the oak tree in the square, to see ourselves in the small mirror upstairs in Grandma's room and not always on the TV screen.

You'll like Bird's people. You'd probably like them even more if, as the Irish priest tells the author, "they could just put themselves to learning the simple art of making a decent cup of tea."

William Dieter
Denver novelist

Paul Robeson
Martin Bauml Duberman
Knopf, $24.95

The undergraduate supernova who burns himself out early in adulthood has become something of an American cliché: it's the late-blooming nerds who seem to rule the world. Paul Robeson was a notable exception, one of those collegiate whizzes—academic scholarship winner, multiple letterman, valedictorian—who disappoint their detractors by going on to perform splendidly in "real life." Of detractors there was no end: Robeson was black and flourished in an era when civil rights were hard to come by for all minority Americans.

By training he was a lawyer (his Columbia Law classmates included Thomas E. Dewey and William O. Douglas), but by profession he was a singer and actor. By temperament and background—his father was a former slave who became a minister—he was an inspirer of those he considered his people: the dark-skinned, the poor, the colonized. Out of weakness he was a procrastinator and a ladies' man who,

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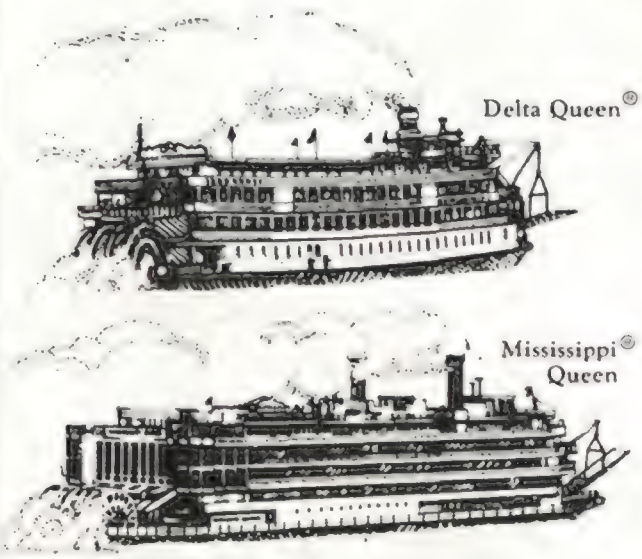

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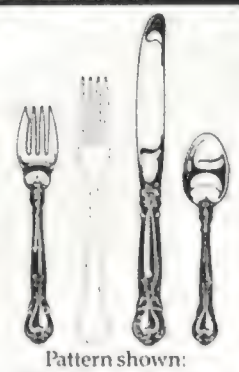

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however large his achievements, never quite attained the artistic greatness that his native ability had brought within his reach. Such, at least, is the testimony of his colleagues, whom historian Martin Bauml Duberman has tracked down, seemingly by the hundreds.

Robeson had a rich bass voice, and his most accomplished body of work was surely his concertizing, in which he sang with heartfelt authority what were then called Negro spirituals: though the term had not yet come into vogue, he was among the first black entertainers to convey soul. He sang "Ol' Man River" in Kern and Hammerstein's *Showboat*, and his career is indissolubly linked with that song and the labor union anthem, "Joe Hill." Early on, he tried to extend his repertoire, with some success as an interpreter of other cultures' folk songs but little as an operatic singer (a limitation he recognized and abided by).

As an actor he made up for what he lacked in technique with authority and presence. As a longtime friend remarked, "The physique and the voice, the *spirit* behind him—you could see it when he was on the stage. . . . But he wasn't a John Gielgud." His greatest stage triumph was as Othello, and he played the title role in Eugene O'Neill's *The Emperor Jones*, a performance that survives on film.

But Robeson's life would hardly be worth writing about at such length (Duberman weighs in with 550 pages of text and 254 more of scholarly apparatus) if he hadn't spoken out so uncompromisingly on political issues. An affinity with the Russian language and its folk songs prompted him to visit the Soviet Union in the 1930s, and there he experienced a revelation: a society apparently devoid of racism. He sang for the Russians, incubated a film deal with Sergei Eisenstein (it never hatched), and unswervingly supported the Communist line without ever joining the party.

The FBI's J. Edgar Hoover took notice and, along with allies in the U.S. Passport Office, made the rest of Robeson's life a tribulation. Robeson and his wife were each summoned by Congressional committees to explain themselves, and for several years during the 1950s he was both persona non grata at home and forbidden to travel abroad. (A low point in governmental intelligence gathering had come in 1944, when Army agents infiltrated Robe-

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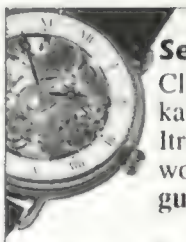

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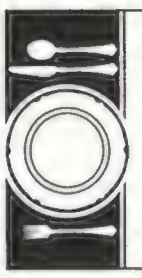

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son's birthday celebration—a mammoth affair attended by several thousand admirers; they "scanned the audience for familiar faces," Duberman reports, "and forwarded a detailed report, which was shared with the FBI.") There was an occasion when even Lillian Hellman, who later memorialized the early 1950s as "scoundrel time," was afraid to be seen with him.

Pariah status was utterly alien to the gregarious Robeson. He became depressed at the loss of contact with audiences and friends, and suffered a series of breakdowns that left him withdrawn and dependent on psychotropic drugs. Duberman covers the last decade of his life, from 1966 to 1976, in a mere 12 pages because so little was left of the great man then.

That he was a great man, though by no means a saint, is the burden of Duberman's biography. It is hard to think of a figure who truckled less to the witch-hunters of the 1950s than Robeson. (He liked to answer the question, "Are you or have you ever been a Communist?" by pointing out that it was irrelevant: "As far as I know it is a legal party.") His steadfast support of all things Soviet looks naive in hindsight, but the driving force behind it—eagerness to embrace a regime that seemed cleansed of racism—surely is understandable.

Duberman, Distinguished Professor of History at Lehman College of the City University of New York, is not a sparkling stylist, and his book bogs down in occasional political longueurs. Even so, it attains a cumulative power that sweeps the reader up in the life of its subject—an experience not unlike that of being swept up by the voice of Paul Robeson himself.

Dennis Drabelle
Washington writer

Behind the Wall:
A Journey Through China
Colin Thubron
Atlantic Monthly Press, $18.95

Only a few months ago, thanks to television, we were all watching electrifying news from China. I saw a shocked Dan Rather of CBS as he was ordered off the air by a government official, and I saw the Cable News Network team ordered to discontinue their own satellite broadcast. One CNN reporter, tense with the drama of the moment, said, "We came to cover a summit, and we walked into a revolution." I watched that report in a motel room in New Jersey, and Tiananmen Square seemed to be just downstairs, right outside the lobby.

But China is a world away and we Westerners may never fully comprehend it. Certainly we recognized ourselves in the faces and hearts of the students in the square, and we recognized, from long experience, the brutality of the government in response. Less easy to understand is a nation that feeds misinformation to its people when the whole world knows it is lying, and the saddening sight of peasants who later told reporters that, as far as they knew, nothing special had happened in Beijing except that the army had been heroic.

Colin Thubron, the English travel writer (*Where Nights Are Longest*, about a solitary journey through the western USSR) and novelist (*A Cruel Madness*), reports on his travels through China in *Behind the Wall*, and you

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Julian Hirsch, Stereo Review, Sept. '88

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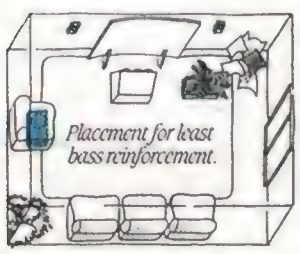

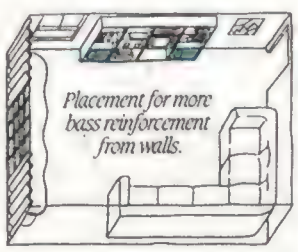

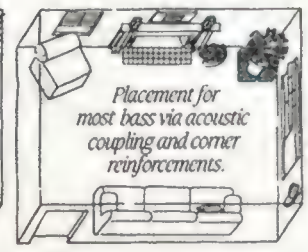

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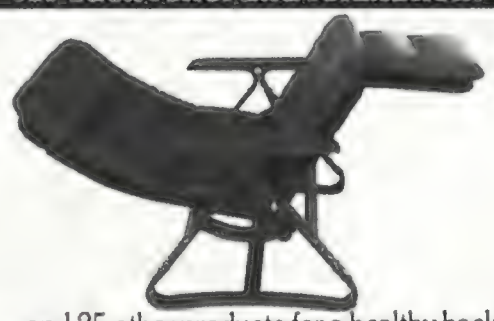

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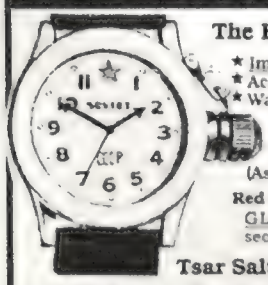

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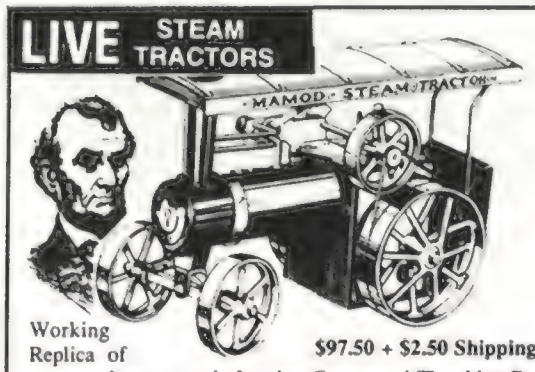

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could not want an account of serious adventures in strange places that is more vivid and immediate, or more unnerving. Written and published before the student revolution, *Behind the Wall* makes it clear that some sort of revolution was inevitable and that the bloodshed was inevitable too.

The book is filled with vital, telling scenes. Thubron meets a woman in her late 50s who spent 28 years in a labor camp, breaking stones for roads. "In China you must conform," she tells him, "but I can't. That's why they think I'm mad. I challenge everything, you see, and that's madness here. I ask *Why? Why?*" Then she laughs bitterly. "*Why?* is not a Chinese question."

But it is a question that must haunt any Western visitor to China who can stay comfortably in a 22-story hotel with neon-lit elevators, observe a thriving marriage-introduction bureau, and afterward visit a local restaurant and, stomach sinking, order "One braised wildcat, please." The contradictions are everywhere—in peasants who, in the midst of a vast nation, live within the narrow horizon of their own hills, and in the young woman who longs to sing opera and wants help with her French diction. "Her cultural isolation," he reports, "was formidable. She owned four classical cassettes, acquired at random: she had never heard of Callas or Sutherland." Eventually, after months of travel outside major cities, it all becomes too much. Thubron finds himself growing irritable and exhausted, worn out by the protein-poor Chinese diet, the constant crush of bodies, the "remorseless, laboratory staring," the impossibility of privacy, and everywhere the "aesthetic drabness and sameness." But the cure, as good travelers know, is to press on, and Thubron ultimately uncovers much of China's endless variety.

Despite the unsettling things he saw and felt there, *Behind the Wall* is among the best of Thubron's many fine books. As travel writing, it is frank and graceful and alive with the "frisson of solitary travel." As a report on a puzzling country and people, it is authentic and convincing. As an effort to understand the unknown, it is heroic. China is in the future for all of us, and if we still can't hear the beat of its heart, at least Thubron gives us a good long look right into the dragon's eyes.

Alan Ryan
Travel writer and novelist

The Life of Graham Greene
Norman Sherry
Viking, $29.95

Graham Greene, arguably the finest living novelist in English, writes "entertainments" as swift and sharp as a sniper's bullet (*This Gun for Hire, The Third Man*); novels of moral confusion and religious uncertainty that would trouble a priest (*The Heart of the Matter, Brighton Rock*); and political thrillers so close to real life they might carry a dateline (*The Quiet American, The Human Factor*). He has been a best-selling author for 60 years—his first book, *The Man Within*, appeared in 1929, and his latest, *The Captain and the Enemy*, just last year. His fictional world of hunted men trapped in seedy places has even been given its own name: Greeneland.

Now in his 80s, Greene lives in France, but over the years the profession of letters has taken him to many of the world's political hot spots: Vietnam, Haiti, Panama, Sierra Leone, Mexico. "When you say to Graham 'Let's go somewhere,' " once noted his boyhood friend Claud Cockburn, "and you mean next month, he means tomorrow afternoon." Greene's lined face, piercing blue eyes and icy demeanor—famous from his dust jacket photographs—are those of one who has journeyed into life's darker alleys, and come back to tell the tale, battered, sadder and wiser.

Such is Greene today, but how did a once-suicidal thrill seeker grow into the world-weary elder statesman of literature? Some of that story can be found in the novelist's own memoirs, *A Sort of Life* and *Ways of Escape*, but these are only partial portraits. For those looking for the full treatment, Norman Sherry's semiofficial life fills in the details, seemingly every last one of them.

Sherry emphasizes the novelist's family background, his psychological sensitivity, the courtship of his wife, and his travels. As a child Greene attended Berkhamsted School, of which his father was headmaster, and suffered there greatly—being fearful of other students, poor at games and envious of his rugged older brothers, as well as prey to a soul-wrenching boredom that led him, in his late teens, to play Russian roulette and attempt suicide. The desire to escape—Greene's most lasting passion—dates from these early years.

Rivaling that passion is his obsession with Vivien Dayrell-Browning, for whom he converted to Catholicism. Leery of sex, she at first refused him; then he proposed a monastic marriage without physical consummation. Sick with love, Greene kept sending her gushy, cutesy letters in a private code (stars designated kisses).

They married in 1927 (a conventional marriage, with children), eventually settled into the idyllic Cotswold town of Chipping Campden, and before long grew bored. At least Greene did. By this time he'd worked as a newspaper copyeditor, begun his lifelong habit of writing 500 words a day, and published a successful first novel and two failures.

Sherry speculates that from his mistaken efforts Greene learned to set aside a penchant for "romance," to build on his skill in observation and to take up more topical, even shocking themes: class warfare, sexual obsession, spiritual decay and, that overwhelming favorite, betrayal. Ultimately, Sherry suggests,

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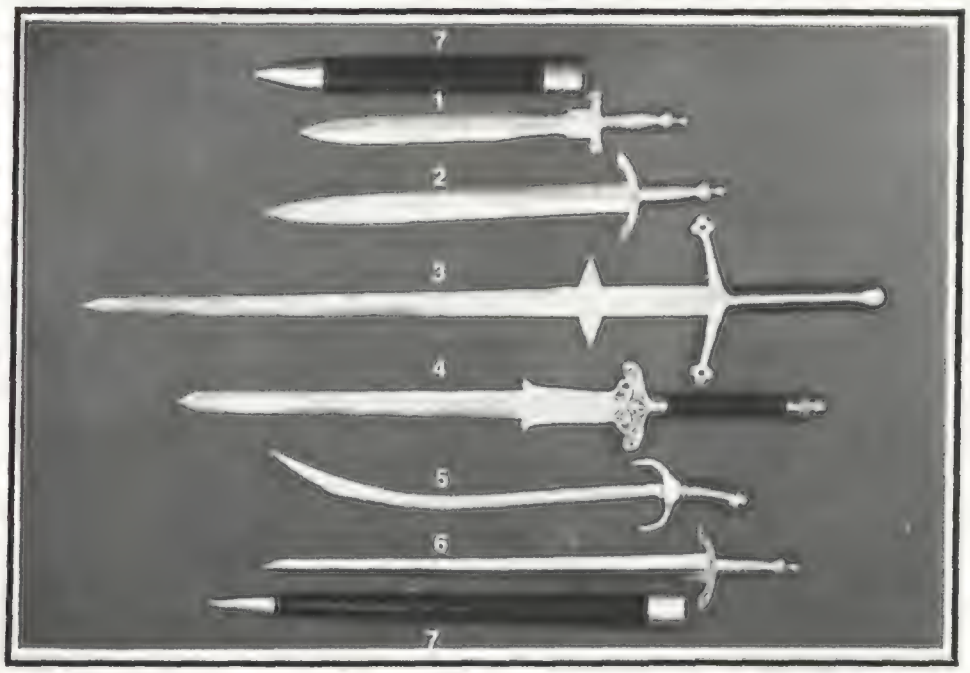

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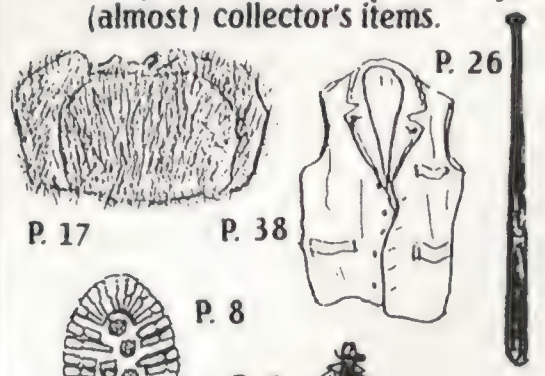

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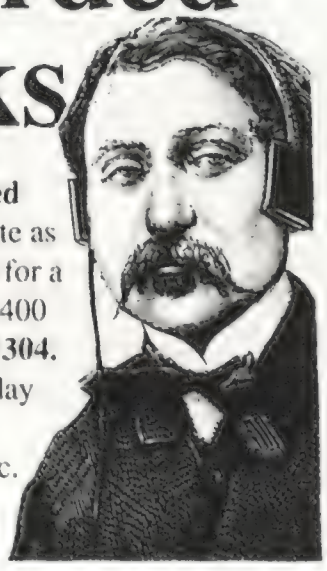

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Michael Dirda
Writer and editor,
Washington Post Book World

Heaven: A History
Colleen McDannell and Bernhard Lang
Yale University Press, $29.95

Writings about Christian faith are often so devout as to interest only the devout, or so scholarly as to interest only the scholars. Great public religious thinkers, such as Paul Tillich, C. S. Lewis and Jacques Maritain, are scarce. Fortunately, once in a while, historians of religion still write books that capture the audience of the educated public. This should be the case with *Heaven: A History*, which is recommended for its readable, well-illustrated text and its fresh, immediate treatment of old theological controversies.

McDannell and Lang's book surveys in lively detail the claims made by Christians about heaven—a term with surprising elasticity of definition. It can mean the celestial realm of God, a gathering place for human beings after individual death or the Apocalypse, or Earth prior to the fall of Man. The authors examine the political origins of apocalyptic thinking among Jews at the time of Jesus. A largely theocentric vision develops in the Middle Ages as mystics impute glorified physical beauty, pure light and everlasting contemplation to the empyrean. From the Renaissance onward, a more anthropocentric view of heaven competes for the attention of the faithful. Pictorial representations by such masters as Fra Angelico, Hieronymus Bosch and, later, Peter Paul Rubens emphasize the dignity of men and women in an ideal (usually pastoral) setting, a place of dance and sunshine and beatific smiles.

A longstanding debate underlies Christian visions of paradise. How is heaven's map to be drawn? Is it to be

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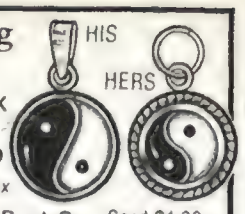

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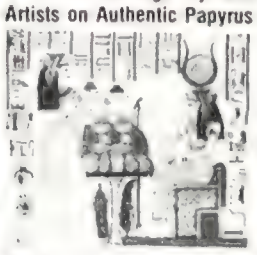

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austere and celestial, or earthlike, familiar and full of plenty? The question is, what is the right reward for a virtuous life? Will one exist in eternity only to contemplate perfect union with Jesus? Is it not wrong to yearn for lesser pleasures? Or does good earthly conduct return one to the company of spouse and friends in a place where angels sing and men and women, like Adam and Eve in Milton's *Paradise Lost*, enjoy the "Rites/ Mysterious of connubial Love" beneath boughs of scented flowers? Are we to relish the pleasures of spirit only, or of sense as well?

The modern era, with the rise of science and skepticism, nevertheless brought interesting visions of the afterlife. These came partly from fringe sects, such as the Swedenborgians and, later, American spiritualists who sought to communicate with the dead. More recently, popular culture has welcomed the reports of people who regained consciousness after being pronounced dead. It is to McDannell and Lang's credit that such "outsiders" are included. Even more to their credit is the rich cultural background they provide for historical conceptions of paradise. The fullness of their treatment and the engaging nature of their subject make *Heaven: A History* worthy of a wide readership.

William Rice
Michigan writer and critic

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Additional reading

Indian Museum (p. 42)

"The Indian Museum's Last Stand" by William Grimes, *New York Times Magazine*, November 27, 1988

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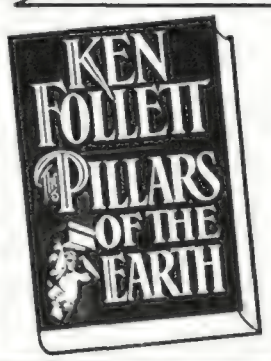

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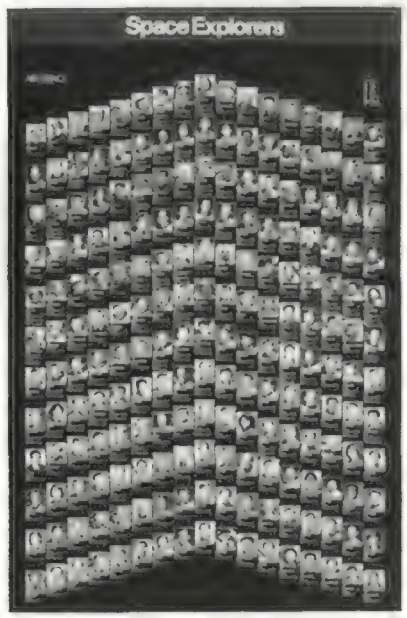

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Bonsai Clubs International (periodical), Bonsai Clubs International (Tallahassee, Florida)

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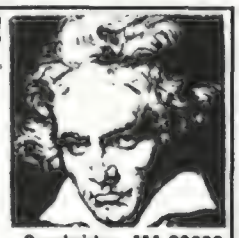

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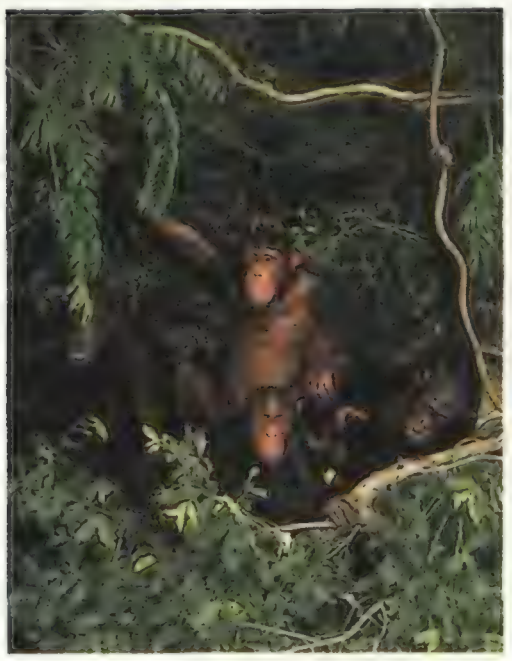

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Smithsonian highlights

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Castle and Freer closings

The Castle, under renovation for the new Information Center, is closed to visitors until late 1989. The Freer Gallery of Art is closed until 1992.

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The Contributing Membership supports the Institution's work in education, research and scholarship. Partially tax-deductible contribution categories are: Supporting, $60 (available only to non-D.C. area residents); Donor, $125; Sponsoring, $300; Sustaining, $600; Patron, $1,200; James Smithson Society, $2,000. Members enjoy special privileges including receiving Smithsonian publications and the engagement calendar. For additional information write to the Contributing Membership Program, 1100 Jefferson Drive S.W., Smithsonian, Washington, D.C. 20560, or call (202) 357-1699.

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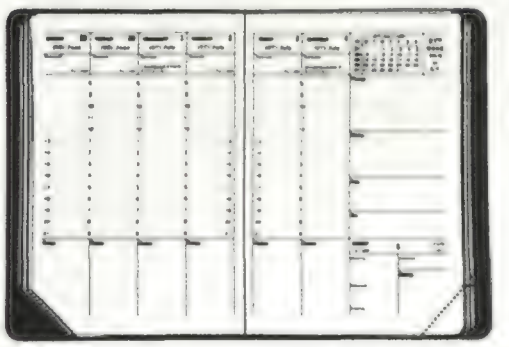

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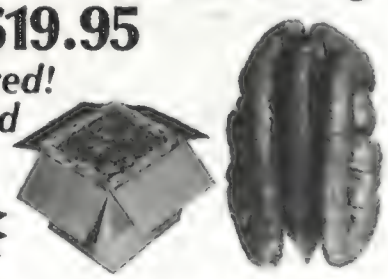

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ics, bronzes and paintings (see *Highlights continued*, page 236).
Slave Quilts from the Ante-Bellum South (October 6-January 1) Thirty quilts, most never before exhibited.

Anacostia Museum
The Real McCoy: African-American Invention and Innovation, 1619-1930 (through November 5) An overview of outstanding black inventors and innovators who made important contributions to American technology.

National Museum of African Art
Icons: Ideals and Power in the Art of Africa (October 25-September 3) A survey of African art, focusing on recurrent themes.
The Essential Gourd (through January 4) Northern Nigerian decorative techniques, traditional and contemporary.

International Gallery, S. Dillon Ripley Center
Caribbean Festival Arts (through February 15) Costumes, music, videotapes, photographs evoke the sights and sounds of the Caribbean street festival.

National Museum of American Art
The Patricia and Phillip Frost Collection: American Abstraction 1930-1945 (through February 11) Seventy-five works by members of the pioneering American Abstract Artists group.

Arthur M. Sackler Gallery
The Noble Path: Buddhist Art of South Asia and Tibet (October 1-March 31) More than 100 objects reflecting the changing imagery of Buddhism.
Yani: The Brush of Innocence (through October 22) Paintings by the internationally renowned 14-year-old artist.

National Portrait Gallery
Portraits of the Law (October 13-January 15) Images of distinguished judges, scholars and courtroom lawyers.
To Color America: The Portraits of Winold Reiss (October 27-April 1) The German-born modernist's 1920s and '30s depictions of American minorities.

Hirshhorn Museum & Sculpture Garden
Francis Bacon (October 12-January 7) Sixty works, celebrating the 80th birthday of the British painter.
DIRECTIONS: Keith Sonnier (through October 29) Neon sculpture by the New York artist.
Houston Conwill: WORKS (through

October 29) An installation evoking the African-American experience.

National Museum of American History
Workers and Managers: The Crises of Control in American Manufacturing (October 2-February 28) Labor history seen through photographs and artifacts.
Men and Women: A History of Costume, Gender and Power (through December 31) Exhibit looks at standards of appearance, behavior.
American Television from the Fair to the Family, 1939-1989 (through April) Artifacts tracing the rise of television.
Sesame Street (through October 15) A look back over 20 years.
The Ceremonial Court Permanent installation re-creates White House spaces from 1902 to the present.

National Air and Space Museum
Eyewitness to Apollo 11 (through December 31) Paintings, drawings interpreting the moon-landing mission.
Carrier War in the Pacific Six major battles re-created through models, maps, photographs, films.
Beyond the Limits: Flight Enters the Computer Age A new gallery explores the computer revolution in aerospace.

Cooper-Hewitt Museum (New York)
The Intimate World of Alexander Calder (October 17-March 11) More than 300 works (see *Around the Mall*, page 24).
Views of Rome: Drawings and Watercolors from the Vatican Library (through October 29) Eighty-five images, traveling for the first time outside the Vatican.

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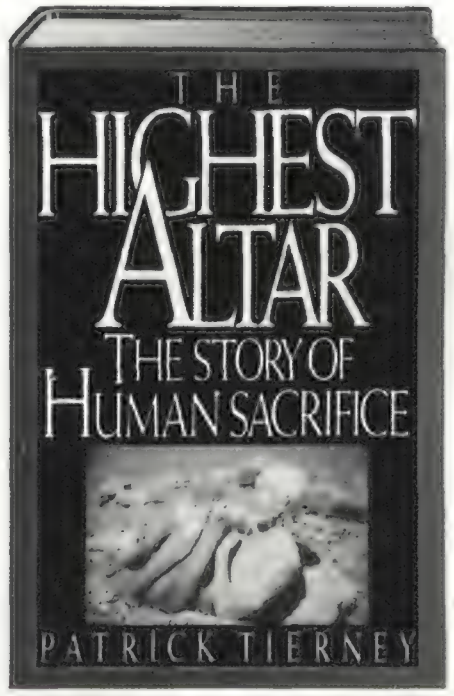

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Here at the Smithsonian: Three-minute TV spots take you behind the scenes.

To find out which stations carry these radio and TV programs, write: Office of Telecommunications, MAH Room BB40, Washington, D.C. 20560.

Lecture and Seminar Program

The Program hosts events in Anchorage and Fairbanks, Alaska; Bozeman, Montana; Pittsburgh, Pennsylvania; Albany, New York; and Norfolk, Virginia, during October. To obtain information on offerings around the country, write to the Lecture and Seminar Program, 1100 Jefferson Drive S.W., Room 3045, Washington, D.C. 20560, or call (202) 357-1350.

Resident Associate Program

To become a Resident Associate, or for fee and ticket information, call 357-3030.
Douglas Fairbanks jr. Reminisces (October 24; 8 P.M.) A life in Hollywood.
The Wall Street Journal: American Business and the World Economy in the '90s and Beyond (six Wednesday evenings beginning October 11; 8 P.M.) Course with panel discussions.
Francis Bacon (October 18 and 25; 8 P.M.) Lecture by scholar Richard Francis.

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some October exhibits:
Hanover, New Hampshire (October 14-December 10) *Plains Indian Arts: Continuity and Change*, Hood Museum of Art.
Jackson, Mississippi (October 14-November 12) *Mark Twain and Huck Finn: Joy-Flags and Milestones*, State Historical Museum.
Midland, Michigan (October 14-November 12) *What Style Is It?*, Midland County Historical Society.
Orono, Maine (October 21-December 17) *From Site to Sight: Anthropology, Photography and the Power of Image*, University of Maine, Hudson Museum.
Smackover, Arkansas (October 24-November 22) *Family Folklore*, Arkansas Oil and Brine Museum.

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Seminars
(continued from page 123)

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America's Art *April 24-27*: Washington, D.C. Survey 19th-century masterpieces with art historian William Kloss.

Contemporary American Furniture *April 30-May 4*: Washington, D.C. Includes visits to working studios and private collections.

The New Astronomies *May 13-18 or May 20-25*: Study with astronomers at the Smithsonian's Whipple Observatory and at Kitt Peak.

Masterpieces of French Impressionism *May 17-20*, Washington, D.C. See special exhibitions at the National Gallery of Art.

Research Expeditions

Contribute your time, talent and financial resources to Smithsonian research. Work with curators at the Smithsonian or at field sites around the country and the world.

Cancún, Mexico *February 16-26 or February 27-March 9*: Study the effects of Hurricane Gilbert on birdlife and vegetation.

Washington, D.C. *March 4-16 or July 22-August 4*: Archive historic aviation documents at the Air and Space Museum.

Costa Rica *March 31-April 12 or April 14-26*: Monitor Arenal Volcano's eruptions and study local vegetation.

Washington, D.C. *May 23-June 6*: Photodocument Memorial Day activities.

Washington, D.C. *June 6-16*: Prepare anthropology collections of animal bones for transfer to a new facility.

Washington, D.C. *June 25-July 8*: Photograph the Festival of American Folklife.

Montserrat *July 1-14, 15-28 or July 29-August 11*: Excavate slave quarters and a cemetery at a Caribbean sugar plantation.

Cody, Wyoming *July 15-28*: Collect plant fossils near Yellowstone.

For seminar brochures, call (202) 357-4700; for expeditions, call (202) 357-1350. Or, write to the address on page 123.

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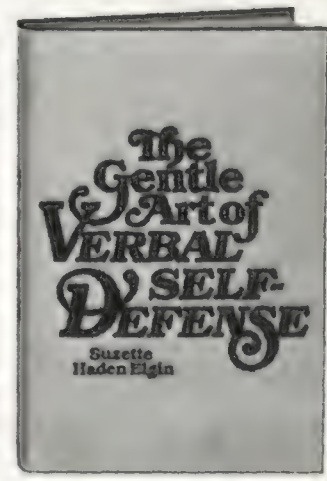

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About the Author

Psycholinguist Suzette Haden Elgin has presented her innovative self-defense principles in a variety of formats. She has given workshops and seminars all over the U.S., including verbal self-defense sessions for doctors, lawyers, and other professionals.

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Highlights continued

Rare offerings from Tiffany

When Louis Comfort Tiffany returned home from travels to Europe and North Africa in 1870, the last thing he intended was joining his father's already legendary New York firm (SMITHSONIAN, December 1987). Instead, the aspiring young painter applied himself to the pursuit of beauty.

His keen interest in matters esthetic led him to found one of the country's first interior design studios. Soon, Tiffany and his colleagues were fashioning lavish, distinctive households for clients from Mark Twain to President Chester A. Arthur.

Over the years, Tiffany went on to create, from his own Tiffany Studios, objects of surpassing elegance—hand-blown glassware, lamps and, of course, windows. Those stained-glass panels, crafted for wealthy patrons and installed in mansions and churches, were his abiding passion.

Eleven of those windows form the nucleus of the Renwick Gallery's "Masterworks of Louis Comfort Tiffany." Composed largely of objects culled from private collections, the exhibition offers an unprecedented glimpse into a master artisan's career.

A handsome book has been published in conjunction with the show. "Masterworks" travels to New York City's National Academy of Design in March.
Kathleen M. Burke

Sarah Fay Sumner Memorial Window adorns an Albany, New York, church.

Cobweb table lamp, c. 1900, was early experiment with a leaded-glass shade.

Fern vase, c. 1905, reflects Tiffany's lasting fascination with botanical forms.

Design for *Flowerform* vase, c. 1900, was based on ancient Roman glassware.

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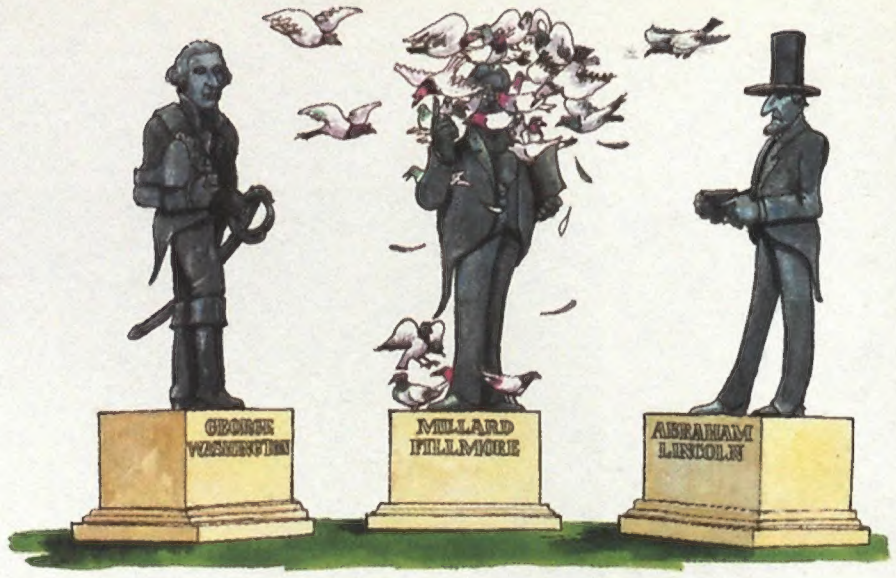
By Barbara Holland

'Millard Fillmore was my kind of guy'



I spend a lot of time thinking about Millard Fillmore and you don't. I can tell. There you sit, musing about Jefferson and Lincoln and Bush, and ignoring Millard completely. It's his name, I suppose. You think if you'd known a kid named Millard Fillmore in school he wouldn't have been a barrel of laughs, but you're just guessing.

Well, listen, maybe *you* can identify with George Washington, put yourself in his shoes and so on, but *I* can't. Millard Fillmore was more my kind of guy, a President I can really relate to.

Millard was memorable for being wrong. The only right thing he did was get born in a log cabin like Jackson, Taylor, Buchanan, Lincoln and Garfield. Cynics believe it was all the same log cabin, rented out for the occasion to ambitious mothers by a real estate entrepreneur. This is probably not true.

His family apprenticed him to a woolcarder. This was much nastier than it sounds, and the wrong thing to be. By the time he showed up for his first day of regular school he was a big boy 19 years old and fell in love with the teacher. He bought his freedom and married her. (This wasn't exactly a classical education, but remember he could card wool, too. Can you?)

He got excited about politics around 1827, when the Anti-Masons came along. The Anti-Masonic Party was all about a bricklayer who hadn't been seen in ages and some hysterical types figured the Masons had done him in. In those days, whenever *anything* happened the bystanders got together and had a political party about it. For alternate entertainment they could read the Bible and goose-grease their boots.

Millard went to the New York State Assembly as an Anti-Mason, which was wrong, of course, and then to Congress as a Whig. In 1848 the Whigs were peering around for a Vice Presidential sort to run with Zachary Taylor, a war-hero general from the Mexican War, and their eye lit on Millard, who looked smarter than he was. He was a tad overweight, which we now know is wrong, but at the time nobody scolded him or told him to count his cholesterol. They thought he looked dignified. It was the scrawny little chaps like Polk and Madison they laughed at.

When Taylor perished tragically from cholera, brought on, the doctors said, by heat exhaustion and an overdose of cold milk and cherries, Millard turned out to be President. This gave him more scope for being wrong. He gave the wrong answer to the slavery question, mumbling that the Southern states should answer it themselves and maybe the Civil War wouldn't happen. (Hah!) He tried to enforce the Fugitive Slave Act. This was not only wrong, it was impossible.

His most memorable idea was the opening up of world trade. He sent Commodore Perry and the frigates *Mississippi* and *Susquehanna* to persuade the Japanese to do their shopping at our stores. The Japanese hadn't spoken to anyone for hundreds of years and they were perfectly happy that way, alone on their islands having tea ceremonies and kicking one another in the ear and conspiring to poison the emperor. Millard thought that after a few rounds of "argument and persuasion" from the frigates they'd eventually wind up with an island full of Chevrolets and RCA record players, and we'd wind up with a vault full of yen.

His other international venture was about Peruvian guano. Guano is a substance deposited by seabirds on rocks and offshore islands and park benches, and people used it for fertilizer. American guano salesmen had been harvesting the stuff, figuring the Peruvians had more than they knew what to do with and wouldn't miss any from their offshore islands anyway. Millard negotiated a deal with the Peruvians, agreeing that in the future we would pay for any fertilizer we took. The guano market collapsed temporarily, so poor Millard didn't even go down in history as the Guano President.

He bought a new stove for the White House and even *that* was wrong. The cook said it was too complicated, and went right on using the open fireplace and getting ashes in the soup.

The Whigs decided he was the wrong President and refused to nominate him in 1852, and since they were falling apart anyway, Millard joined the Know-Nothing party. These folks claimed to know nothing about what they were doing and believed that nobody who wasn't born here, and a Protestant, should be allowed to vote or get elected or have any nice jobs or any fun at all. Millard ran for President on the Know-Nothing ticket in 1856, wrong as ever, and carried Maryland.

After that he went away to live in Buffalo, New York, and as far as anyone knows he was happy as a clam there, and nobody noticed he was wrong. When his wife died he married a rich widow and served as the very first president of the Buffalo Historical Society. *They* thought he was a perfectly swell president, and who are you to disagree?

Now will you think about Millard Fillmore? Not all day, of course, but sometimes? Every time you mail your gloves, for instance, and try to put your hands in your letters.

Now that's good fortune.

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